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CANADA

Tariff Board

Report (by) *of the Tariff*
Board in Reference 53.

(THE TARIFF BOARD)

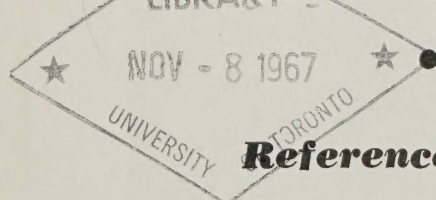
Relative to the Inquiry Ordered
by the Minister of Finance
respecting

CHEMICALS



VOLUME 8

ORGANIC CHEMICALS IN HEADINGS
15.10, 15.11, 22.08, 22.09 and 29.01 to 29.13
OF THE BRUSSELS TARIFF NOMENCLATURE



Reference No. 120



Report by
THE TARIFF BOARD

Relative to the Inquiry Ordered
by the Minister of Finance
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CHEMICALS



VOLUME 8

**ORGANIC CHEMICALS IN HEADINGS
15.10, 15.11, 22.08, 22.09 and 29.01 to 29.13
OF THE BRUSSELS TARIFF NOMENCLATURE**



Reference No. 120

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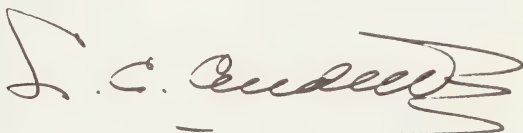
The honourable Mitchell Sharp, P.C., M.P.
Minister of Finance
Ottawa

Dear Mr. Sharp:

I refer to Mr. Harris' letter of September 21, 1956 and to Mr. Fleming's letters of October 11, 1957 and December 21, 1959 in which the Tariff Board was requested to conduct an inquiry respecting chemicals.

In conformity with Section 6 of the Tariff Board Act, I have the honour to transmit Volume 8 of the Report of the Board, in English and in French. This Headings 15.10, 15.11, 22.08, 22.09 and 29.01 to 29.13 of the Brussels Tariff Nomenclature. Further volumes will be forwarded to you as soon as they have been completed.

Yours sincerely,

A handwritten signature in dark ink, appearing to read "D. C. Anderson". The signature is fluid and cursive, with a long horizontal stroke at the end.

Chairman

Explanation of Symbols Used

- Denotes zero or none reported
- .. Indicates that figures are not available
- * In statistical tables, indicates a reported figure which disappears on rounding, or is negligible
- (a) A small letter in brackets denotes a footnote to a table
- (1) A number in brackets denotes a footnote to the text
- s.c. Denotes a Dominion Bureau of Statistics import or export statistical class

The sum of the figures in a table may differ from the total, owing to rounding

A Note on the Organization of the Report - Reference 120

The first four volumes of the Report by the Tariff Board respecting Reference 120, Chemicals, relate to the reference as a whole; the eleven volumes which follow (Volumes 5 to 15, inclusive) relate to the products which were the subject of the Board's inquiry. The principal subject matter of each of the volumes is given below in terms of the headings of the Brussels Tariff Nomenclature (B.T.N.). Occasionally, chemicals of different B.T.N. headings are dealt with together, for example, chlorine (28.01) and caustic soda (28.17); the more detailed tables of contents of the individual volumes indicate where this occurs.

To the extent that particular statistical tables could be related to specific products or B.T.N. headings they are included in the statistical appendix of the volume which deals with that product or heading. Some tables, which could be related only to broader groupings of chemicals, are included in the statistical appendix to the last volume dealing with such broader groupings: inorganic chemicals in Volume 7, organic chemicals in Volume 9 and artificial resins and plastics in Volume 15.

Because of the unprecedented amplitude and complexity of Reference 120 - Chemicals, many parts of Volumes 5 to 15 were written a considerable time before the first four volumes. This gives rise, occasionally, to apparent discrepancies, attributable to the passage of time, particularly between Volume 4 and those which follow.

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2	Goods in Recommended Items
3	Goods in Existing Items
4	General Considerations; Summary and Conclusions

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8	Organic Chemicals	15.10, 15.11, 22.08, 22.09 and 29.01 to 29.13
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* The numbers shown after product designations are those used in the Brussels Tariff Nomenclature

ORGANIC CHEMICALS - B.T.N. CHAPTER 29INTRODUCTION

Organic chemistry is, broadly speaking, the study of carbon compounds — chemical substances whose distinguishing feature is the presence of carbon. Notwithstanding this, some carbon compounds (notably the oxides of carbon as well as the metallic and ammonium carbonates, cyanides, carbides, cyanates, and thiocyanates) are classified as inorganic chemicals; in chemistry, others may be classified as both organic and inorganic chemicals, but in this report these have been classified as one or the other.

This part of the report, following the system of the Brussels Nomenclature, has been organized into 45 headings. In the B.T.N., these are grouped into thirteen sub-chapters, each dealing with a specific kind of organic chemical and its derivatives, as follows:

- (1) Hydrocarbons and their halogenated, sulphonated, nitrated or nitrosated derivatives (B.T.N. headings 29.01 - 29.03)
- (2) Alcohols and their halogenated, sulphonated, nitrated or nitrosated derivatives (B.T.N. headings 29.04 - 29.05)
- (3) Phenols, Phenol-alcohols, and their halogenated, sulphonated, nitrated or nitrosated derivatives (B.T.N. headings 29.06 - 29.07)
- (4) Ethers, Alcohol peroxides, Ether peroxides, Epoxides with a three or four member ring, Acetals and Hemiacetals and their halogenated, sulphonated, nitrated or nitrosated derivatives (B.T.N. headings 29.08 - 29.10)
- (5) Aldehyde-function compounds (B.T.N. headings 29.11 - 29.12)
- (6) Ketone-function compounds and Quinone-function compounds (B.T.N. heading 29.13)
- (7) Acids, Acid anhydrides, Acid halides, Acid peroxides and peracids and their halogenated, sulphonated, nitrated or nitrosated derivatives (B.T.N. headings 29.14 - 29.16)
- (8) Inorganic esters and their salts and their halogenated, sulphonated, nitrated or nitrosated derivatives (B.T.N. headings 29.17 - 29.21)
- (9) Nitrogen function compounds (B.T.N. headings 29.22 - 29.30)
- (10) Organo-inorganic compounds and Heterocyclic compounds (B.T.N. headings 29.31 - 29.37)
- (11) Provitamins, Vitamins, Hormones and Enzymes, natural or reproduced by synthesis (B.T.N. headings 29.38 - 29.40)

- (12) Glycocides and Vegetable Alkaloids, natural or reproduced by synthesis, and their salts, ethers, esters and other derivatives (B.T.N. headings 29.41 - 29.42)
- (13) Other Organic Compounds (B.T.N. headings 29.43 - 29.45)

This part of the report includes also a discussion of fatty acids (B.T.N. heading 15.10), glycerols (B.T.N. heading 15.11), ethyl alcohol and denatured spirits (B.T.N. headings 22.08, 22.09) and vinegar (B.T.N. heading 22.10).

Although this part of the report deals with a great many products, the number of chemicals for which individual studies have been made is not large relative to the hundreds of products whose names were brought before the Board. The available data indicate that the value of shipments of all of these products is well in excess of \$200 million. While this figure contains the usual duplication that results when materials are shipped and then enter into the value of shipments of other products, it understates the importance of some products because of the large volumes which are not shipped but used captively as process chemicals. About two thirds of this total value is accounted for by shipments of 15 products. Attention is concentrated chiefly on these and on some others having a significant volume of imports, or around which particular issues revolved. Imports of the products of this chapter were about \$104 million in 1964; exports in the same year had a value of about \$55 million.

If gauged by the value of shipments in 1962, two groups stand out as particularly significant. One of these, the hydrocarbons of heading 29.01, accounted for over one-quarter of the shipments of all the chemicals in this chapter; the other, the alcohols and glycols of heading 29.04, accounted for nearly 17 per cent. Other headings, individually, were less than 10 per cent, some being of almost no commercial significance in Canada. The hydrocarbons of heading 29.01 are the building blocks for most of the products of later headings as well as for a vast array of other products. Within this heading, benzene, acetylene and styrene achieved the highest value of shipments, though ethylene, butylene and some of the other products acquired very substantial importance through captive use. Under B.T.N. heading 29.04, ethylene glycol was by far the most significant in commerce, with over 60 per cent of the shipments of the heading; when pentaerythritol is added, over 80 per cent of the value of shipments of the products under the heading is accounted for.

The hydrocarbons of heading 29.01 are compounds of carbon and hydrogen derived principally from coal-tar, petroleum, natural gas and, to a much lesser extent, vegetable sources. Historically, and continuing on a significant scale, the tars removed from coal during the production of coke for steel making have been a primary source of many hydrocarbons, among them the aromatics benzene, toluene and xylene. But to an ever-increasing extent, pride of place as the source is passing to crude oil and natural gas, produced in Canada since 1857, but dating its most active growth from the discovery of the Leduc Field in Alberta in 1947.

In addition to being the source of most of the energy consumed in Canada, liquid petroleum and natural gas are the basis of the burgeoning petrochemical industry which produces materials for plastics, paints, pharmaceuticals and a very wide range of other products. The transition from crude to final product begins in a petroleum refinery and continues through petrochemical and fabricating plants, frequently altering not only the physical form but also the chemical structure of the raw materials. Much of the transition is evident in various products dealt with here, but it carries over into other parts of this report.

To distinguish between petroleum products and petrochemicals is extremely difficult. However, the Minister of Finance, in referring chemicals to the Board for study, specifically excluded petroleum products from the terms of the Reference, and the Board must, therefore, determine, for purposes of this study, the point at which a substance ceases to be a petroleum product and becomes a chemical.

Petroleum hydrocarbons produced in the course of normal refinery operations have frequently been regarded as products of petroleum, and the products of later processes, as petrochemicals. But under today's operating conditions a refinery may be equipped to turn out a range of products formerly considered the prerogative of a chemical plant. The distinction requires a more fundamental criterion, namely, differences between the products themselves. As noted in Appendix II, a petrochemical not only must be derived from liquid petroleum or natural gas, but also be of a purity sufficient to produce a predictable chemical reaction, a purity achieved in the later refining stages. Only products of the required purity are the subject of this study; the delineations are given in the subsequent product sections and in the Appendix.

The products which are the subject of this part of the report are significant chiefly because they are the raw materials for other products such as paints, explosives, plastics, insecticides, solvents, surface-active agents, or pharmaceuticals. Few of them are ready for use by ultimate consumers; in some instances, in fact, one or another might exist only fleetingly as a process chemical in the making of some other product, never being withdrawn from the process as a chemical entity.

Some of these chemicals have an extremely broad range of uses; they are the precursors of many other compounds. Of these, acetylene, ethylene and benzene might be cited as examples. Some others, such as vinyl chloride, more specialized in their application, are extremely important because of the volume of consumption in that use, or for some other compelling reason. Still others, perhaps vital to the companies making or using them, do not have a substantial commercial market and lack the breadth of general usefulness.

Both at the refinery and at the chemical plant the company's concern is how to get the best possible combination of products from the available materials. The products are generally the result of very complex operations which frequently begin with a petroleum fraction, take off certain products, alter or refine these or others in process, combine or treat some with additional chemicals and possibly re-cycle part of the original stream back to the initial supplier or to another

buyer, or use it as fuel, in solvents or in some other way. A company is likely to produce a range of products, some the same as, and some competitive with those of another company, while possibly simultaneously producing other products for sale to the competitor, complementary to his line of products or quite different from them. As a result, it is the various complexes of products which are matters of principal concern to the large, integrated or inter-related producers rather than considerations of one or another of the products in isolation.

Most of the products that came before the Board are dutiable under tariff item 208t or item 711, or are entered free of duty under end-use items such as 791, 851 and 921. It is probable that, based on actual collections of duty and total imports, the average rate of duty for all the products of the chapter taken together is under 8 per cent.

For example, in 1964, of nearly \$104 million of imports that could be identified as probably classified to B.T.N. Chapter 29, nearly \$60 million were entered duty-free. On the remaining \$44 million the duty collected represented an average rate of 15.4 per cent, but when calculated on total imports, including those duty-free, the average rate was 6.6 per cent. Approximately 88 per cent of all imports were from M.F.N. countries; of these, about 53 per cent were entered free of duty. Of the 12 per cent that were from British preferential sources, more than 87 per cent were entered free of duty; as a result, duties collected expressed as a percentage of total B.P. imports represented an average rate of less than two per cent.

The users of the chemicals generally favoured retention of existing end-use provisions. Some users were anxious to establish or retain duty-free entry or low rates of duty for products while not made in Canada, while agreeing to the Industry Committee's proposed heading rates when the products are made in Canada, thus very largely rendering unnecessary any end-use provision which might also have been proposed. The producers of the basic chemicals, for the most part, sought rates of 15 p.c., B.P. and 20 p.c., M.F.N., and the Industry Committee proposed these rates for the residual products of the headings. These rates would apply not only to listed "not made" products when they become made in Canada, but also to products which do not merit separate listing under the headings. The argument in favour of these rates relied on the assertion that, in the experience of the industry, they provided a level of protection behind which the industry could become established and grow; their uniform application would encourage flexibility by the companies in the creation or adjustment of the product-mix. It was frequently stated by producers that increases in rates of duty would not necessarily induce them to increase their prices.

HYDROCARBONS - B.T.N. 29.01INTRODUCTION

The Brussels system of classification has organized heading 29.01 in five groups of chemicals as follows:

<u>Group</u>	<u>Example</u>
1) Saturated acyclic hydrocarbons	butanes ethane propane
2) Unsaturated acyclic hydrocarbons	acetylene butadiene butylene ethylene propylene
3) Cyclanes and cyclenes	cyclohexane cyclopentane cyclopropane
4) Cycloterpenes	camphene pinene
5) Aromatic hydrocarbons	benzene cumene ethyl benzene naphthalene styrene toluene xylene

Three of these groups have particular commercial importance in terms of this study. The first is the aromatics group encompassing herein, benzene, toluene, xylene, cumene, ethyl benzene, naphthalene and styrene. Led by benzene, the aromatics in 1962 accounted for over forty per cent of the value of shipments of the entire heading. However, the value of shipments fails to measure the significance of products consumed captively in the plants where they are made. Acetylene, ethylene, propylene, butylene and butadiene, members of the second group of hydrocarbons, are of very great importance to the chemical industry and to other industries, but they are not traded so extensively, being used directly in the manufacture of other chemicals. The third group, the cyclanes and cyclenes, gains major significance through cyclohexane, an important material for use in the manufacture of nylon. The two remaining groups, the saturated acyclic hydrocarbons and the cycloterpenes, are of lesser commercial importance; their members are not given extensive treatment in this study.

I AROMATIC HYDROCARBONS

"These compounds are derived from benzene, a hydrocarbon composed of 6 atoms of carbon and 6 atoms of hydrogen, arranged in 6 groups of (CH) to form a hexagonal ring known as a benzene or aromatic nucleus." (1) The various aromatic hydrocarbons are derivations from the benzene ring with side chains replacing hydrogen atoms to form the different compounds. Hydrocarbons with only one benzene ring include the most important commercial products - benzene, toluene and xylene, ethyl benzene and styrene. Other aromatic hydrocarbons dealt with in this report are naphthalene and cumene.

BENZENE, TOLUENE, XYLENE

Benzene, toluene and the three isomers of xylene, (the BTX's) are produced as co-products. They have a similar range of uses, and many of the same companies are interested in all three, proposing generally similar tariff treatment for them. For these reasons the products are dealt with together in this section. The three isomers of xylene are referred to collectively as xylene except where it is necessary to distinguish them.

The production of the BTX's in Canada has a commercial value of about \$20 million per year when allowance is made not only for sales of the products but also for captive use by companies in the manufacture of other chemicals. It is estimated that from two million to five million dollars of this amount represents exports of the products. Imports of the BTX's in the late 1950's far exceeded exports, but in 1962 the position was reversed, with exports valued at more than three times imports. In 1964, imports and exports appeared to be in approximate balance at about \$5 million; part of the explanation for the relatively high imports is noted below in the discussion on benzene.

(1) B.T.N., Explanatory Notes, Vol. 1, p. 234

The Products

The physical characteristics of the BTX's are as follows:

	<u>Benzene</u>	<u>Toluene</u>	<u>Xylene*</u>
Formula	C_6H_6	$C_6H_5-CH_3$	$C_6H_4-(CH_3)_2$
State (under normal conditions)	Liquid	Liquid	Liquid*
Colour	Colourless	Colourless	Colourless
Odour	Aromatic	Aromatic	Aromatic
Flammability	Burns readily in air with sooty flame	Less flammable than benzene	Less flammable than toluene
Solubility	Slightly soluble in water Soluble in alcohol, ether, acetone, carbon tetrachloride, carbon disulphide	Insoluble in water Soluble in alcohol, benzene ether	Insoluble in water Soluble in alcohol, ether
Boiling point	80.1°C	110.7°C	ortho xylene 144°C meta xylene 139.3°C para xylene 138.5°C
Grades**	Nitration Industrial Industrial-90	Nitration Industrial	Nitration Five - degree Ten - degree Industrial

* The three isomers, ortho xylene, meta xylene and para xylene, may be separated from each other and from ethyl benzene by distillation and fractional crystallization. The first two are normally liquid, but the para xylene may be either a liquid or colourless crystals.

** The grades here referred to are those described by the American Society for Testing Materials (A.S.T.M.)^(a) in a rigorous definition of these materials in what the spokesman for the Steel Company of Canada, Limited, called "Chemical degrees of purity".^(b) They are listed here in sequence from most pure to least pure. Criteria of purity depend on the range of distillation under controlled conditions of pressure and temperature and on such other characteristics as colour and acidity.

(a) A.S.T.M. Standards on Benzene, Toluene, Xylene, Solvent Naphtha, September 1956; American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa., U.S.A.

(b) Transcript, Vol. 37, p. 5519

The criteria developed by the A.S.T.M. establish for each grade the range of temperature within which a specified proportion (measured by volume) of the product distills. The most exacting specifications require that one hundred per cent of the product distills with only a very narrow tolerance from its boiling point. For example, at standard pressure, nitration grade benzene and toluene are allowed a tolerance of plus or minus one degree Centigrade from their boiling points. The A.S.T.M. standard is not expressed in terms of "purity". However, most of the discussion before the Board was carried on in terms of the requisite purity to admit the products as chemicals for purposes of this Reference. One proposal was that a product consisting of 50 per cent or more by weight of benzene, toluene or xylene should be regarded as that chemical. Another proposal would require that the particular chemical constitute 90 per cent or more by weight of the product. In relating this last criterion to the A.S.T.M. standards, the Imperial Oil spokesman noted that its nitration grade benzene would be toward the top end of the range of 90 to 98 per cent benzene which he spoke of as "the commercial grades of benzene that are commercially bought and sold and referred to as benzene and possess the chemical properties thought of as attributable to benzene".⁽¹⁾

The problem of the classification of these products as chemicals, for purposes of this report, is discussed further in the section on Tariff Considerations and in Appendix II.

Process of Manufacture of BTX's

The two principal sources from which benzene, toluene and xylene are derived are coal and petroleum.

The preparation of coke from coal and a subsequent distillation yield a mixture of light oils which is fractionally distilled to obtain benzene, toluene, xylene and solvent naphtha. The benzene is in essentially pure form, but toluene must be purified by treatment with sulphuric acid and again fractionated to obtain refined toluene. Xylene is produced in a similar manner to toluene.

The BTX's are derived from petroleum in a two-step process which involves the separating out of the naphtha feedstock containing the aromatics from the refinery stream and the subsequent extraction of the BTX's. The variations of this process are known by different names, the one most frequently referred to at the public hearing being the Platformer - Udex process.

When a specially prepared naphtha feedstock, mixed with hydrogen, is heated and passed through a reactor containing a platinum catalyst, in a process known as dehydrogenation, it yields a "reformate" rich in aromatics, as well as gasoline base stock and such fuel gases as butanes. The reformate is feedstock for the Udex plant.

(1) Transcript, Vol. 37, p. 5480

The Udex process uses aqueous diethylene glycol as a solvent to extract the aromatic hydrocarbons from the feed. Because of the high boiling point of the solvent, the dissolved aromatics are distilled from it in three "cuts" yielding, successively, benzene, toluene and xylene. The resulting benzene is of a nitration grade but the toluene is first washed with sulphuric acid to remove impurities and then re-distilled to produce nitration grade toluene. The isomers of of xylene are separated by fractional crystallization.

Benzene can also be produced from toluene in a process in which toluene is reacted with hydrogen over a catalyst. Excess hydrogen and methane, which result from the process, are removed and the liquid product fractionated to separate benzene from unreacted toluene. This method of producing benzene is economic only when there is an adequate price spread between benzene and toluene to absorb the process cost which runs around 7 to 8 cents per gallon of benzene made.⁽¹⁾

The ratio in which the three products are extracted whether from coal-tar or petroleum will vary from one supply of raw material to another and the extent to which a company is deliberately trying to maximize the output of one product or another. Coal-tar tends to yield a higher proportion of benzene than does petroleum. Nevertheless, in volume produced, benzene is by far the largest of the BTX's derived from coal-tar or from petroleum. For example, in coking, "on the average, every ton of coal gives 11.8 pounds of benzene in addition to 2.7 pounds of toluene, and 1.3 pounds of xylene".⁽²⁾ For petroleum, based on data for Canadian production in 1962, the share of benzene in the total appears to be somewhat smaller than in the above coal-tar ratios, but it is still by far the largest of the three. Moreover, the toluene and xylene which are produced from petroleum can be further processed to yield additional benzene if that is desired.

The Industry

Aromatics production from coal results from the making of coke for the steel industry and so has been subject to the many fluctuations in demand for steel. In addition, the newer methods of making steel, involving the use of oxygen and of natural gas for fuel, have diminished the amount of coke used for this purpose; in the United States the amount of coke used in steel making is said to have dropped one third in the last ten years.⁽³⁾ The overwhelming role of petroleum-based aromatics is illustrated by the estimate that of a total capacity in the United States of about 850 million gallons of benzene per year, some 700 million gallons is petroleum based.⁽⁴⁾

Prior to World War II only small amounts of the BTX's were produced in Canada, and these were derived from coal-tar. The demand for products in the precisely specified grades of benzene, toluene and xylene was very much smaller at that time. The Steel Company of Canada,

(1) Chemical and Engineering News, July 20, 1964

(2) Same, March 20 and March 27, 1961 (reprint)

(3) Chemical and Engineering News, July 20, 1964

(4) Same

for example, noted that in 1939 most of its related production was in the form of "motor benzol", a crude form of benzene used in motor gasoline. This product has apparently disappeared from commerce, and the BTX's have emerged as far more significant derivatives of coal-tar. Residual parts of the coal-tar may then be disposed of for the recovery of other products such as naphthalene, cresols and coal-tar pitch. Coal-tar can also be sold to petroleum companies for recovery of the BTX's in their refineries.

In the early post-war years the price of benzene was said to have been too low to attract petroleum companies into its production. Polymer Corporation reported that, in 1947, it purchased benzene at 15 cents a gallon. During and following the Korean War, shortages developed and the price rose substantially. Some users were reported to be paying 55 cents, 60 cents or more per U.S. gallon during times of shortage. Steel strikes, or threatened strikes, in the U.S.A. also aggravated the supply situation and exerted upward pressures on prices. The decline in the use of coking facilities in steel making further limited the supply of BTX's from coal. In the mid-1950's, the petroleum industry began to invest the substantial amounts necessary to establish production facilities for the BTX's.

In Canada, Canadian Oil Companies in 1957 added facilities to its Sarnia refinery to manufacture BTX's. This capacity was expanded in 1960. In 1961, three petroleum companies came on stream for the production of one or more of the BTX's. These were: The British American Oil Company, Limited, Imperial Oil Limited and Texaco Canada Limited. Polymer Corporation began to manufacture toluene from purchased benzene in 1943.

No complete data are available concerning the capacity of Canadian companies to produce benzene, toluene and xylene. Because of the nature of the manufacturing processes, it is likely that any company producing one of the three BTX's could also produce the others although the individual chemical may not, in fact, be separated. Restriction of production to one or another depends upon market opportunity or captive need. For example, The British American Oil Company's Udex unit can extract toluene, xylene and ethyl benzene in addition to benzene, "although initially they will not be separated until sufficient demand exists to permit economical production".⁽¹⁾ It was reported at the public hearing in 1961 that only The Steel Company of Canada (Stelco) and Canadian Oils Limited were recovering toluene and xylene at that time; information for 1962, as tabulated below, indicated additional producers of toluene and xylene in that year. Dow Chemical of Canada reported that it also produced small quantities of toluene, though not enough for its own requirements. B.A. Oil reported that it was recovering additional benzene from the available toluene; this production was associated with the manufacture of cumene for further processing by B.A.-Shawinigan to phenol and acetone. In 1963, with the beginning of its production of cyclohexane, B.A. Oil substantially increased its captive use of benzene. Imperial Oil Limited reported that it produced benzene, but purchased toluene and xylene for re-sale; it is reported to have begun to produce toluene and xylene. The available information on the production

⁽¹⁾ Transcript, Vol. 36, p. 5388

of the three products by the principal companies, in 1962, is summarized in the following tabulation.

<u>Company</u>	<u>Product Manufactured (1962)</u>		
	<u>Benzene</u>	<u>Toluene</u>	<u>Xylene</u>
1. Algoma Steel Corporation, Ltd. Sault Ste. Marie, Ontario	X	X	X
2. Dominion Steel and Coal Corporation Sydney, Nova Scotia	X	X	X
3. Steel Company of Canada Ltd., Hamilton, Ontario	X	X	X
4. Polymer Corporation Limited Sarnia, Ontario		X	
5. British American Oil Company Ltd., Montreal, Que.	X	X	
6. Imperial Oil Limited Sarnia, Ontario	X	X	
7. Quebec Natural Gas Corporation, Montreal, Quebec	X	X	X
8. Shell Canada Limited, (a) Sarnia, Ontario	X	X	X
9. Texaco Canada Limited, (b) Port Credit, Ontario	X	X	X

(a) Shell Canada Limited acquired the Canadian Oil Companies, Ltd., plant in 1963

(b) Plant operated by Regent Refining (Canada) Ltd., a subsidiary of Texaco Canada Ltd.

The British American Oil Company, Limited estimated at the time of the hearing in May 1961, that benzene capacity in Canada was about 60 million gallons a year, of which its own Udex solvent extraction plant at Montreal was capable of supplying 6 million. The plant was also capable of making toluene, xylene and ethyl benzene. At Corunna, Ontario, the Shell Canada Limited plant, then belonging to Canadian Oil Companies, Ltd. was capable, in 1961, of producing 7 or 8 million gallons of aromatics per year. This plant produces benzene, toluene and xylene, selling all three to chemical manufacturers in the Sarnia area. Toluene from Shell's Udex unit was also reported to be converted to benzene at the rate of some 3.5 million gallons of benzene per year.⁽¹⁾ Imperial Oil's aromatics plant, in 1963, was said to be

⁽¹⁾Canadian Petroleum Association, Statistical Yearbook, 1963, p. 68

capable of producing a total of 30 million gallons of benzene and toluene per year.⁽¹⁾ At the time of the hearing, the Company reported that, by the end of 1961, its plant at Sarnia would be capable of producing 25 million gallons of benzene per year of which part was for use in its own petrochemical operation and part was committed by agreements to supply consumers in the domestic and export markets. Export business was said to be essential to economic production.

The reported capacities of some selected plants in the United States to produce benzene are given below. Each is much larger than most plants in Canada, but it should be noted that Imperial Oil's plant compares favourably in size with them. In addition to the plants listed below, there are very many smaller plants operating in the U.S.A.

Benzene Capacity of Selected U.S. Plants
1961 or 1962

<u>Company</u>	<u>Location</u>	<u>Benzene Capacity Million Imperial Gallons per year</u>
Delhi Taylor	Corpus Christi, Texas	29
Gulf Oil	Port Arthur, Texas	27
Gulf Oil	Philadelphia, Pa.	10
Humble Oil	Baton Rouge, La.	20
Humble Oil	Baytown, Texas	46
Monsanto	Chocolate Bayon, Texas	35
Shell Oil	Houston, Texas	25
Shell Oil	Wood River, Ill.	15
Standard of California	El Segundo, Calif.	21
Sun Oil	Marcus Hook, Pa.	17
Texaco	Port Arthur, Texas	25

Source: Transcript, Vol. 36, p. 5399, and Chemical and Engineering News, March 20, 1961, p. 118

The capacities listed above represent just under half of the total estimated capacity in the U.S.A. at that time.

The Market

Benzene

Benzene has been referred to as the foundation stone of aromatics chemistry. It is the starting material for a great number of chemicals which, in turn, enter into the manufacture of synthetic

(1) Canadian Petroleum Association, Statistical Yearbook, 1963, p. 68

fibres, synthetic resins, dyes, detergents, solvents and other products. Apart from the very large quantities used captively by two of the producers in Canada, there is a very substantial commercial market that has been increasing rapidly. From an estimated 12 million Imperial gallons in 1956, the Canadian market increased to approximately 22 million gallons in 1960. There has been a substantial increase both in the Canadian market and in export sales since that time. Information available to the Board indicates that in 1962 total sales, including exports, exceeded 30 million Imperial gallons, valued at nearly \$10 million. U.S. trade statistics report imports of benzene from Canada in that year at the equivalent of about 12 million Imperial gallons, valued at \$4 million. This would indicate that domestic sales were approaching 20 million gallons in 1962, with a value of the order of about \$6 million. There undoubtedly have been increases in domestic sales since that time.

This growth in domestic and export sales in recent years has been accompanied by an even greater expansion in domestic production of benzene, not only because of the growing captive requirements, but also because domestic production has been replacing imports as a source of supply of the market in Canada. Imports of benzene, which exceeded two million Imperial gallons in 1956 and eight million gallons in 1958, declined to about one million gallons in 1962, and apparently were very much lower than that in 1963. Thus, Canada became a net exporter of benzene in the early 1960's. The data for 1964 show imports of benzene amounting to more than 150 million pounds valued at \$3.6 million. The average value of these imports, however, suggests that they contained a substantial portion of a crude naphtha product rather than refined benzene. Well over half of the imports came from the U.S.A. with the remainder from Venezuela. U.S. import data indicate that Canada remained, in total, a net exporter of benzene in 1964.

About three quarters of the Canadian market was said to be in the Sarnia area of Ontario, with the manufacture of styrene the predominant use, taking some 10 million gallons in 1961. The use of benzene at Sarnia to make detergent alkylates is another substantial outlet in that area. Most of the remainder of the market was reported to be in the Montreal area, for the manufacture of phenol and maleic anhydride; these products, in turn, are intermediate chemicals in the manufacture of synthetic resins. No significant market was noted in the Atlantic provinces or in western Canada.

The Canadian market has been served in different proportions through the years by the three main sources of supply--coal-tar benzene, benzene produced in Canada from petroleum and imports. Moreover, as Canadian production increased, supplies became available for export. As noted at the hearing:

"While coke oven supplies were in fairly good balance up to 1953 as evidenced by only nominal imports, from that point onward they did not keep pace and accounted for less than half of last year's 1960 total supply ...

"Consequently, it is concluded that imports have not forced coke oven benzene production levels significantly below capacity levels at any time, but rather that the limitation has been imposed by the steel industry's requirement for coke."(1)

Production of the BTX's from petroleum began in Canada in 1957. Some surplus supply of benzene was reported to exist in 1959, following a shut down of the Polymer plant for some months in that year. The available benzene was exported. The spokesman for Imperial Oil Limited observed:

"The year 1959 points out in dramatic fashion the kind of export opportunities open to Canadian industry if benzene capacity is available to take advantage of it."(2)

Perhaps one fifth of total supply of benzene is used captively, principally by B.A. Oil and Imperial Oil Limited, for the production of intermediate chemicals. Imperial Oil Limited uses part of its production for the manufacture of detergent alkylates; the company noted, however, that most of its production was for sale, chiefly in export markets. For B.A. Oil, the manufacture of cumene, as one of the largest uses in Canada, represents a substantial captive requirement for benzene. The company stated that "it was principally in order to ensure itself of a reliable and economical source of supply that British American decided to produce benzene at its Montreal refinery".(3) Since the time of the hearing, B.A. Oil has developed another substantial use for benzene, the manufacture of cyclohexane, an important intermediate for nylon.

Imperial Oil Limited predicted that "with the completion of benzene plants now under construction, a significant part of the benzene now consumed in Canada will be produced in the consumers' own plants, and will not be bought or sold ..." (4)

In the U.S.A., production of styrene, phenol and cyclohexane are reported to consume about three quarters of the benzene produced for chemical use. With B.A. Oil's production of cyclohexane, Canada now has all three of these very substantial outlets for benzene, and it is probable that, while the proportionate use of the three individually differs appreciably from that in the U.S.A., together they account for at least as large a share of the total in Canada as in the U.S.A.

(1) Transcript, Vol. 37, p. 5494

(2) Same, Vol. 37, p. 5497

(3) Same, Vol. 36, p. 5387

(4) Same, Vol. 37, p. 5502

Toluene

The spokesman for B.A. Oil, in noting the uses of toluene said:

"Toluene has been used mainly in aviation and motor gasolines, and as a solvent. A growing volume of toluene goes to explosives (TNT), plastics and chemicals such as phenol, caprolactam for Nylon 6, and terephthalic acid for Dacron/Terylene. Toluene is also a potential source of benzene through several dealkylation processes." (1)

Developments in the chemical industry in Canada suggest that the use of toluene for conversion to benzene, together with its use for synthetic fibres, have likely been important elements in its increasing consumption in recent years. The paint industry was also reported to use large quantities of toluene and xylene as thinners and solvents; for some of these products it is probable that mixtures of toluene and xylene are used rather than chemically defined grades of one or the other. Available information indicates that production of toluene is likely in excess of 12 million gallons which would have a commercial value of more than three million dollars at market prices. A substantial proportion of the production, however, does not enter commercial channels, but is used by producing companies in their own operations.

Canada's uses, sources of supply and international trade for toluene have, in some respects, been subjected to even greater volatility and change than for benzene, though the amounts involved are considerably smaller. Both imports and exports have fluctuated markedly from year to year. Available data indicate that, in 1961, imports of toluene amounted to about two million gallons, valued at \$600,000, while exports in that year were not substantially different from imports in quantity or value. In 1962, however, imports were approximately twice as great as in 1961, whereas exports declined appreciably, to less than half a million gallons, valued at about \$100,000. More recent data indicate that, in 1963, Canada's exports to the U.S.A. were about 2.7 million gallons, valued at \$554,000 and imports into Canada, about 4 million gallons, valued at \$870,000. In 1964, Canadian exports to the U.S.A. were 4 million gallons valued at \$840,000, and imports into Canada were approximately 6 million gallons, valued at \$1.3 million. Thus, in recent years, Canada has been a net importer of toluene, and trade in the product has been appreciably higher than in the early 1960's. One important use for imported toluene in 1961 and 1962 was reported to be for the manufacture of phenol at Dow Chemical's plant at Ladner, B.C.

Xylene

Production of xylene in Canada had been small prior to increased production by some of the petroleum companies in the early 1960's. Although some xylene had been available from coal-tar and, after 1957, from petroleum, imported xylene has been an important part of supply. Xylene is consumed in much smaller quantities than either benzene or toluene. In 1962, production of xylene in Canada was about

(1) Transcript, Vol. 36, p. 5390

four million Imperial gallons, which would have a market value of nearly \$1.5 million. Imports have fluctuated considerably in value, generally having a value between \$100,000 and \$400,000, which would represent between approximately 300,000 and 1,400,000 gallons. Exports, according to U.S. data on imports from Canada, were reported in 1962 to be about 640,000 Imperial gallons valued at \$192,000. In 1961, however, exports to the U.S.A. had been about double this amount, and in 1963 more than one million gallons, valued at \$284,000 were exported to the U.S.A.

The paint industry has been by far the largest user of xylene, taking approximately half of the available supply in 1962. Primary plastics and other chemical uses appear to have consumed most of the remainder. Although certain chemical uses do require one or another of the individual isomers of xylene, the Board was advised that no significant market existed in Canada for the separate isomers.

Prices

It is difficult to establish meaningful prices for the BTX's over a number of years because of fluctuations in demand and supply, and because published prices do not necessarily reflect changes in the contractual arrangements that typify the purchase and sale of the BTX's. With the advent of large-scale sources of supply from the petroleum industry wide swings in price such as were reported to have occurred, particularly for benzene throughout the 1950's, are likely to disappear.

Prices of the BTX's in Canada were said to follow closely the delivered prices of the products from the U.S.A., with little or no allowance for import duties because entry would be chiefly either duty-free under end-use or drawback provisions, or at the very low rates provided under tariff item 269.

In general, some reductions in the published prices of toluene and xylene in the U.S.A. have occurred, particularly in 1957-1958 and again in 1963. In the early 1950's, the reported price of both toluene and xylene was 33 to 35 cents per U.S. gallon; in 1958, the price of toluene was about 25 cents per gallon and that of xylene about 29 cents per gallon. By 1963, toluene was quoted at about 21 cents per gallon, in the U.S.A., and xylene at about 25 cents. For benzene, the reduction in 1957-58 is somewhat concealed by the fact that the price of benzene had experienced a sharp increase during the Korean War; the published price reached a high of 40 cents per gallon in 1953-54 compared with 30 cents in 1952. By 1958, the price of benzene had dropped back to 31 cents per gallon; in 1963-64, it was 25 cents per U.S. gallon.

In assessing the relevance of the U.S. published price to the Canadian market, allowance must be made for several factors. Purchases made by long-term contract may be at prices considerably different than the published price; for Canadian use, the U.S. price must be converted to its equivalent for the larger Imperial gallon, and allowance must be made for exchange rate, duty and any additional transportation and handling costs. In the comparison which follows, allowance has been made for the difference in the size of the gallon and for the exchange rate. Even allowing for any duty and additional cost for

transportation, the comparison suggests that in 1963 and 1964 supplies from the U.S.A. could have been landed in Canada well below the prices shown for the Canadian BTX's. However, the data that are available indicate that not only imports but also exports were higher in 1964. Other information, particularly for benzene, indicates that bulk sales are made in Canada in some years at prices well below the reported prices.

Reported Canadian and United States Prices
of Benzene, Toluene and Xylene,
1959-1965

Year	Benzene		Toluene		Xylene	
	Canada (a)	U.S.A. (b)	Canada (a)	U.S.A. (b)	Canada (a)	U.S.A. (b)
	cents per gallon					
1959	40	36	35½	29	40	33
1960	41½	40	35½	29	39½	34
1961	41½	40	35½	30	39½	35
1962	41½	35	34	32	38	37
1963	41½	32	34	32	38	38
1964	41½	32	34	27	38	32
1965	..	27	32	24	37	27

(a) Benzene: industrial grade; tank car; works; Imperial gallon
Toluene: tank car; freight allowed Ontario; Imperial gallon
Xylene: industrial grade; tank car; freight allowed Ontario;
Imperial gallon

(b) Benzene: industrial or nitration grade; tank car; freight
equalized
Toluene: industrial or nitration grade; tank car; f.o.b. various
points
Xylene: U.S. prices converted to Imperial gallon equivalent
and expressed in Canadian dollars on the basis of annual
average rate of exchange; annual average prices are used
1959-61; March prices are used 1962-65

Source: Canadian Chemical Processing, annual price survey;
Oil, Paint and Drug Reporter

TARIFF CONSIDERATIONSExisting Tariff

There are a number of items in the Customs Tariff under which benzene, toluene and xylene may be entered; the principal ones are:

<u>Item No.</u>		<u>B.P.</u>	<u>M.F.N.</u>
208t	(Chemicals, n.o.p., not made in Canada)	Free	15 p.c.
263a	Coal-tar benzol, when imported by refiners of crude petroleum, for use exclusively in blending with gasoline wholly produced in Canada	10 p.c.	10 p.c.
269	Products of petroleum, n.o.p.:— (i) Lighter than .8236 specific gravity (40.3 A.P.I.) at 60 degrees Fahrenheit....per gallon	$\frac{3}{4}$ ct.	1 ct.
	(ii) .8236 specific gravity (40.3 A.P.I.) or heavier at 60 degrees Fahrenheit.....per gallon	1/3 ct.	1/3 ct.
711	(unenumerated articles)	15 p.c.	20 p.c.
851	Materials for use in the manufacture of synthetic rubber	Free	Free
921	(Materials, not made in Canada, for the manufacture of synthetic resins and plastics)	Free	Free

In addition, some imports may be made, duty-free under other end-use items, for example items 791 and 863. Most imports, however, apparently are entered under tariff item 269(ii), for which the ad valorem equivalent of the specific rate has been just over one per cent in recent years. The largest market for benzene in Canada is for the manufacture of synthetic rubber for which duty-free entry is provided under item 851; Canadian producers, therefore, must price their product under essentially duty-free conditions.

Entries under the other items appear to have been relatively small. However, because item 269 is restricted to derivatives of petroleum, any imports of the BTX's produced from coal-tar would not be entered under that item, but rather under item 711 or 263a. Item 263a is believed to relate to the product sometimes called motor benzol, the use of which for blending into motor gasolines is obsolete. Item 263a, therefore, is understood to be inoperative.

Tariff item 269 is within the terms of Reference 120 only in so far as it relates to chemicals and plastics. In considering the representations which would have an effect on this item, therefore, the Board has to decide whether any of the goods under the item are

within the Reference and, if so, what goods these are. Representations were made on this matter.

These have been discussed in general terms in the introductory part of this section and are presented briefly below, with particular reference to the BTX's. They are outlined further in Appendix II.

Classification

The degree of refinement of the material was represented before the Board as the main line of demarcation between petroleum products and chemicals. Two sets of criteria, in addition to the A.S.T.M. standards, were put forward for benzene, toluene and xylene. These were:

B.T.N. Heading

Industry Committee Criteria(1)

- | | |
|---|-------------------------|
| 1. When containing 50 per cent or more by weight of benzene, toluene or xylene, single or mixed isomers | 29.01 |
| 2. When containing more than 90 per cent by weight of benzene, toluene and xylene or any two of them but less than 50 per cent by weight of any one of them | 38.19 |
| 3. Other | Not in
Reference 120 |

Imperial Oil Limited Criteria(2)

- | | |
|---|-------------------------|
| 1. When containing 90 per cent or more by weight of any one of benzene, toluene, a single xylene isomer, or a mixture of xylene isomers | 29.01 |
| 2. When containing a total of 90 per cent or more by weight of benzene, toluene and xylene, but less than 90 per cent by weight of a single hydrocarbon or mixture of isomers of a single hydrocarbon | 38.19 |
| 3. Other | Not in
Reference 120 |

The effect of the Industry Committee's recommendation is to bring under heading 29.01 a much wider range of products than would be brought in by Imperial Oil's recommendation. The latter would take from item 269, as chemicals of heading 29.01, only products of a relatively high degree of purity. However, the proposals by both parties for inclusion of mixtures under heading 38.19 would have the effect of bringing within the scope of Reference 120 approximately the

(1) Transcript, Vol. 42, p. 6181

(2) Same, Vol. 42, p. 6187

same range of products; only the distribution between headings 29.01 and 38.19 would be different.

The Industry Committee reported that it had developed its criteria after consultation with the manufacturers of hydrocarbons, with Imperial Oil Limited dissenting from the 50 per cent criterion. The proponents of the 50 per cent criterion cite, as the principal reason for selecting this lower purity, the danger that imports of less than 90 per cent purity could be further refined and thus circumvent whatever protection is accorded to the 90 per cent product. The classification proposal, therefore, reflected concern over adequate protection, which is discussed in the following sub-section.

Imperial Oil argued, in favour of the higher level of purity, that the BTX's are commonly produced and sold in purities of 90 per cent or higher, and that the 50 per cent criterion is artificially low for a single substance in commercial use.

If only hydrocarbons of a degree of purity suitable for predictable chemical reactions are to be classified under heading 29.01, the 90 per cent criterion is the more appropriate.

Both proposals would provide that mixtures containing more than 90 per cent by weight of BTX's should be classified under an item like B.T.N. heading 38.19, as "Mixtures".

In the Explanatory Notes to B.T.N. heading 38.19 there is reference to "mixed alkylbenzenes" and "mixed alkylnaphthalenes". These preparations require processing beyond distillation of the BTX's and are designed for use in preparing surface-active agents. They are, therefore, particular preparations, more restricted in scope than the criterion proposed by the parties before the Board. Apart from these, the B.T.N. provides only for the "separate chemically defined compounds" of heading 29.01 and the crude forms of petroleum of Chapter 27. For petroleum, a somewhat analogous provision would exist if the Canadian Customs Tariff contained, in addition to item 269, an item with the intended scope of B.T.N. heading 29.01. The detergent alkylate preparations of heading 38.19 would very likely be classified as mixtures or preparations under the Canadian Customs Tariff.

If the BTX's are classified by an item like B.T.N. heading 29.01, the anomaly in the Canadian Tariff which results from petroleum products being dutiable under item 269 and coal-tar products being dutiable under item 711 will disappear for the chemically defined products, but will remain for the crude forms that are not part of this study.

Rates of Duty

A variety of proposals for rates of duty on benzene, toluene and xylene were put before the Board. Requests for higher rates came from manufacturers of the BTX's although there was not unanimity among them. The Steel Company of Canada Limited recommended lower rates of duty, for example, than did the British American Oil Company, Limited and Canadian Oil Companies, Limited (now part of Shell Canada Limited). The proposals by Steelco were supported by Algoma Steel Corporation, Limited; Dominion Foundries and Steel, Limited; Dominion Steel and Coal

Corporation, Limited; and Quebec Natural Gas Corporation. Imperial Oil Limited did not agree with the other producers but suggested maintaining the current rates or reducing them to free entry. The users of the BTX's, generally, wanted low rates of duty. The various proposals, and their supporters, are set out in the following table.

Import statistics for benzene suggest that some 75 per cent of dutiable imports from the United States are entered under item 269(ii) and are, therefore, produced from petroleum. Hence, any rate exceeding 1/3 cent per gallon (which is equal to about 1 per cent ad valorem) would represent an increase for most of the dutiable imports of benzene. Imperial Oil, however, estimated that any proposed duty would apply to less than 25 per cent of the benzene consumed in Canada because of export drawback and captive use of Canadian-made product. Part of any increased duty might be borne by users in western Canada, where a substantial amount of toluene in particular is consumed because of their inability to purchase BTX's from central Canada at a competitive laid-down cost.

The Plywood Manufacturers Association of British Columbia said that "experience has shown that domestic prices take full advantage of tariff protection ... and ... we would regard increased duties on Benzene, Cumene, Cyclohexane and Toluene as the first step in a process which will lead to increased duty on the resin".⁽¹⁾

The British American Oil Company, Limited, in proposing an increase in the rate of duty to 15 p.c., B.P. and 20 p.c., M.F.N., noted that the purpose was not to increase the price to Canadian consumers. Consumers are safeguarded by the large number of competing producers and by "the great excess of available capacity over demand".⁽²⁾ The company wanted Canadian producers to be allowed to compete fairly for the Canadian market and to replace present and potential imports of benzene with material made in Canada. In pressing its case, B.A. Oil forecast that the growing over-capacity for benzene in the petroleum industry in the United States will tend to push coal-tar based benzene, produced mainly along the Great Lakes, into Canada. It would enter Canada at reduced prices because it is merely a by-product of the steel industry which typically does not have storage capacity, but sells coal-tar products at any price necessary to move them.

More recently, however, trade sources have reported that the demand for benzene in the United States and elsewhere is unexpectedly strong. The principal reason is the strong demand for styrene, with the resultant demand for benzene. Moreover, as has been noted, coal-tar from coking operations is not generally an increasing source of supply.

Although benzene producers in the U.S.A. have the capacity to create an over-supply, the producers from petroleum sources have succeeded in keeping supply in line with demand. In addition, most producers of coke oven light oils are, apparently, delivering their crude product to petroleum operators for conversion to BTX.

⁽¹⁾ Transcript, Vol. 38, p. 5588

⁽²⁾ Same, Vol. 36, p. 5403

Proposed Rates

Company	Benzene		Toluene		Xylene	
	B.P.	M.F.N.	B.P.	M.F.N.	B.P.	M.F.N.
British American Oil Co. Ltd.	15 p.c.	20 p.c.	15 p.c.	20 p.c.	15 p.c.	20 p.c.
B.A. Shawinigan Ltd.	15 p.c.	20 p.c.	*	*	*	*
Canadian Oil Companies Ltd.	15 p.c.	20 p.c.	15 p.c.	20 p.c.	15 p.c.	20 p.c.
Texaco Canada Ltd.	15 p.c.	20 p.c.	*	*	*	*
Dow Chemical of Canada Ltd.	do not oppose above		do not oppose above		do not oppose above	
Steel Company of Canada Ltd. (a)	7½ p.c.	10 p.c.	7½ p.c.	10 p.c.	7½ p.c.	10 p.c.
Polymer Corporation Ltd.	Free	Free	*	*	*	*
Imperial Oil Ltd. (b)	1/3¢/gal	1/3¢/gal	1/3¢/gal	1/3¢/gal	1/3¢/gal	1/3¢/gal
Plywood Manufacturers Association of B.C.	no increase		no increase		no increase	
Rubber Association of Canada	1/3¢/gal	1/3¢/gal	1/3¢/gal	1/3¢/gal	1/3¢/gal	1/3¢/gal
R.J. Brown Co. of Canada (b)	1/3¢/gal	1/3¢/gal	1/3¢/gal	1/3¢/gal	1/3¢/gal	1/3¢/gal
Canadian Manufacturers of Chemical Specialties Assoc.	*	*	*	*	1/3¢/gal	1/3¢/gal
Canadian Pulp and Paper Association	no increase		1/3¢/gal	1/3¢/gal	no increase	

* No proposal

(a) Stelco was supported by Algoma Steel, Dofasco, Dosco and Quebec Natural Gas
 (b) Imperial Oil and R.J. Brown would agree to free entry

The spokesman for Canadian Oil Companies, Ltd. also noted that the Canadian market would be a logical outlet for surplus benzene, toluene and xylene from the United States, and said that protection is required for existing Canadian plants.⁽¹⁾ Canadian imports of benzene from the U.S.A., however, have declined from about 5.7 million gallons in 1958 to about 4,000 gallons in 1963, although they were apparently somewhat higher again in 1964.

The Steel Company of Canada, in proposing rates of $7\frac{1}{2}$ p.c., B.P., 10 p.c., M.F.N., noted that the rates were approximately an arithmetic average between the rates on coal-tar BTX's dutiable under item 711 and petroleum BTX's dutiable under item 269. The spokesman suggested that rates of 15 p.c., 20 p.c. were no longer necessary following the devaluation of the Canadian dollar and a strengthening of the anti-dumping rules.

Texaco Canada Limited, in a letter read into the record at the public hearing, proposed 15 p.c., B.P., 20 p.c., M.F.N. for benzene, fearing that rates of $7\frac{1}{2}$ p.c., B.P. and 10 p.c., M.F.N. would be inadequate protection "against the invading of the Canadian markets by foreign-produced benzene at distressed or incrementally determined prices".⁽²⁾

None of the companies that proposed increases in the rates of duty drew attention to any imports, or threatened imports, from countries enjoying the British preferential rate.

Imperial Oil Limited, on the other hand, suggested that the tariff rate for each of the BTX's should remain at 1/3 cent per gallon or that it could be reduced to allow free entry.

Imperial Oil noted that the existing rate had not discouraged investment in benzene facilities in Canada either by that company or by others. The company operates the largest plant in Canada (capacity 25 million gallons per year) and its scale of operations was said to be competitive with many of the largest in the U.S.A. Of the eleven U.S.A. companies listed earlier, only four have greater capacity, including two only marginally larger. The spokesman for Imperial Oil said that, because many of the materials made from benzene (e.g. synthetic rubber) are exported, the benzene qualifies for drawback of duty, and Canadian manufacturers, therefore, in effect meet duty-free competition in important areas of benzene demand, and no tariff would be of assistance in barring such imports. With respect to toluene, the company noted that it imported the product, and saw no justification for higher rates of duty.

Polymer Corporation Limited agreed with Imperial Oil on free entry for benzene, suggesting that capacity to produce the BTX's was being installed in Canada without the higher rates of duty, and that Canadian producers had not claimed "any disability in producing in Canada".⁽³⁾

(1) Transcript, Vol. 37, p. 5461

(2) Same, Vol. 38, p. 5586

(3) Same, Vol. 38, p. 5642

The Rubber Association noted that the rubber industry uses all three of the BTX's, principally as solvents. The proposed rates of 15 p.c., B.P., 20 p.c., M.F.N. could result in appreciable increases in cost to the industry; consequently the Association supported the recommendation by Imperial Oil Limited.

The spokesman for R.J. Brown Company of Canada Limited referred to the company's position as a substantial importer of petroleum toluene and xylene for re-sale. The rate of 20 per cent which was proposed under the M.F.N. Tariff could result in an increase of between 4 to 6 cents per Imperial gallon of toluene and xylene. A Canadian manufacturer should be able to buy his materials at the best world prices, and the company suggested that the rates of item 269 should continue to apply, or that duty-free entry be permitted.

With reference to benzene and xylene, the Canadian Pulp and Paper Association noted that it must strongly oppose any revision which would result in an increase over current tariff rates either now or in the future, in respect of chemicals used by the pulp and paper industry.

The Canadian Manufacturers of Chemical Specialties Association, making representations before the Board on behalf of one of its member firms, was in agreement with the position taken by R.J. Brown Company.

A proposal for the continuation of tariff item 863 was made to the Board by Charles E. Frosst and Company in connection with benzene in the reagent and pure grades, which the company uses in the manufacture of steroid derivatives. It stated that, since these chemicals are not made in Canada, the protection of Canadian industry is not involved and the cost of pharmaceutical chemicals made from them should not be subjected to an increase resulting from higher tariff rates. The spokesman for the Industry Committee noted that these products are made in Canada. The company then agreed that products made in Canada and readily available should not be imported duty-free.⁽¹⁾

On balance, the Canadian producers hinged their argument on potential overcapacity in the United States and the potential consequent exports from that country to Canada. No evidence was presented to show that costs in Canada are such as to prohibit domestic manufacturers from meeting foreign prices. On the contrary, with very little protection they have encountered little competition from imports. In addition, demand for benzene in the United States has continued strong so that anticipated serious surpluses have not, to date, developed. Imports from the U.S.A. have not supplied a large part of total Canadian requirements and have been approximately balanced by Canadian exports.

(1) Transcript, Vol. 78, p. 11958

OTHER AROMATICS

Although many other aromatic hydrocarbons are classified under B.T.N. heading 29.01, only four are dealt with separately here. These are cumene, ethyl benzene, naphthalene and styrene. Dodecyl benzene and similar alkyl benzenes in the form of single, chemically defined compounds, are classified under heading 29.01; however, they are generally found in commerce as mixed alkyl aryl hydrocarbons, otherwise referred to as "detergent alkylates". These mixtures are dealt with in the section of the report for B.T.N. heading 38.19.

Cumene

Cumene (isopropylbenzene) is a colourless liquid. It boils at a temperature of 153°C and is insoluble in water though soluble in alcohol and many other organic solvents. The raw materials for its manufacture are benzene and propylene which form cumene by alkylation.

In Canada, at the time of the hearing in 1961, cumene was made only by the British American Oil Company Limited at the Montreal refinery and the sole purchaser was B.A. Shawinigan Limited, a company then owned jointly by British American Oil and Shawinigan Chemicals Limited. Since April, 1964, Shawinigan Chemicals Limited has been a wholly owned subsidiary of the British American Oil Company Limited. The production, therefore, of cumene is captive. Plant capacity is reported to be about 200,000 barrels (7 million gallons) per year.⁽¹⁾

Cumene is used in Canada almost entirely for making phenol and acetone. Its use as an additive for aviation gasoline has almost ceased.⁽²⁾ The spokesman for B.A. Shawinigan Limited said, "Cumene is our major raw material and we consume in excess of 50 million pounds per year. So far as we are aware, there is currently no other market for cumene in Canada and we are, therefore, the only user."⁽³⁾

Because there is no appreciable market for cumene, there is no useful price information. The only available price, of 14 cents per pound, was regarded by the spokesman for B.A. Oil as unrealistically high. It might possibly be a price applicable to drum lots. "This price of 14 cents a pound is entirely unrealistic, and one would not make phenol if one had to purchase cumene at this price."⁽⁴⁾

If the price were something under 10 cents a pound, the Canadian requirements of cumene would have a commercial value of the order of four million dollars.

Although no imports of cumene have been reported, the spokesman for the British American Oil Company, Limited expressed fear of

(1) Chemistry in Canada, June, 1964, p. 24

(2) Transcript, Vol. 37, p. 5419

(3) Same, Vol. 37, p. 5456

(4) Same, Vol. 37, p. 5426

potential imports from plants in the United States which have surplus capacity. He was concerned, also, with competition from plants in Canada and the U.S.A. which produce phenol directly from toluene without the usual prior production of cumene. Such a process, of course, could undermine the largest market for cumene. In 1960, some 5 million pounds of phenol were imported and in addition toluene, from which phenol is manufactured in British Columbia, is imported. In 1964, only about one-half million pounds of phenol were imported.

Cumene currently would probably be imported into Canada under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N., or possibly duty-free under tariff item 92l. The British American Oil Company, Limited recommended that the rates of item 71l (15 p.c., B.P., 20 p.c., M.F.N.) should apply. The Plywood Manufacturers Association of British Columbia opposed any increase in the rates because of the potential effect on the costs of products made from cumene.

Ethyl Benzene

Ethyl benzene, also known as ethyl benzol or phenylethane, is a colourless, mobile liquid with a not unpleasant, aromatic odour. It has a specific gravity of 0.866 at 20 degrees Centigrade, a boiling point of about 136 degrees Centigrade, and is less volatile and less flammable than benzene. It weighs 7.21 pounds per gallon at 25 degrees Centigrade.

This chemical may be prepared in three ways:

- a) by heating benzene and ethylene in the presence of a catalyst, followed by distillation;
- b) by extraction from petroleum reformat streams as a co-product in the manufacture of benzene, toluene and xylene;
- c) by distillation of coal-tar.

The first method, alkylation, is currently used in Canada in the continuous flow process for making styrene. The second method might be used, as the British American Oil Company noted, "when sufficient demand exists to permit economical production".⁽¹⁾ The third method is said to be of no commercial importance.

Dow Chemical of Canada Limited and Polymer Corporation Limited, both at Sarnia, Ontario, produce ethyl benzene in the course of making styrene. However, it is an intermediate product not normally taken out of the process and it is seldom deliberately produced as a product. The raw materials, ethylene and benzene, are readily available from the nearby petroleum refineries.

(1) Transcript, Vol. 36, p. 5388

"Ethyl benzene has a large volume usage in the manufacture of styrene for synthetic rubber (SBR) and polystyrene plastics, so that it is the demand for styrene which determines the consumption of ethyl benzene...

"The rapidly expanding market for polystyrene should increase demand for styrene and hence for ethyl benzene. If conditions are favourable, this could lead to further expansion of ethyl benzene facilities in Canada."(1)

Because ethyl benzene is not generally an article of commerce, no public information is available on the quantity of ethyl benzene used.

Canadian consumption is almost entirely captive, being very largely for the manufacture of styrene, although small quantities may be used as solvents. Imports have dropped from a total of about 848,000 gallons in 1956 to apparently negligible amounts in recent years. Separate export statistics are not available, but Dow Chemical of Canada reported the export of some 5.5 million pounds in 1960 to its parent company in the United States owing to the critical shortage of benzene in that country at the time.(2)

No price for ethyl benzene has been established in Canada because the substance is not generally traded. In the United States over the past eight years published prices have drifted downward from a high of 18.5 cents per pound to about 10 cents. The U.S. price is quoted for ethyl benzene, 99% pure, in tank car lots, freight equalized.

Tariff Considerations

Ethyl benzene is entered under tariff item 208t, as a chemical deemed to be not made in Canada for tariff purposes, duty-free under the B.P. Tariff and at 15 p.c., M.F.N. It could also be entered duty-free from M.F.N. countries under end-use item 851, when for the manufacture of synthetic rubber and under item 921, when for the manufacture of synthetic resins.

Only two companies made representations specifically on ethyl benzene. Dow Chemical proposed that ethyl benzene be subject to the same rates of duty as proposed for the styrene monomer, namely 15 p.c., B.P., 20 p.c., M.F.N. B.A. Oil included ethyl benzene with benzene, toluene, xylene and cumene in a proposal for rates of 15 p.c., B.P., 20 p.c., M.F.N. for these products whether derived from petroleum or coal. The company sought simplification of the Customs Tariff by this uniformity of rates.

Polymer Corporation requested continued free entry for materials used in making synthetic rubber; ethyl benzene would qualify when for that use.

(1) Transcript, Vol. 41, p.6129

(2) Same, Vol. 37, p. 5424

Naphthalene

Naphthalene is a solid hydrocarbon available in either crude or refined form. Refined naphthalene has a melting point above 79°C; at 78°C, the product is about 95 per cent naphthalene, and cruder forms are produced at lower melting points. The refined form is white, crystalline, volatile flakes or powder, and possesses a strong odour, exemplified by moth balls. Crude naphthalene is not classified under B.T.N. heading 29.01, but as a coal-tar or petroleum product of Chapter 27.

Historically, naphthalene has been produced by the distillation of the middle-oil fraction from coal-tar. This portion is run from the primary distillation unit to shallow pans where it is allowed to cool so that the naphthalene can crystallize. The crystalline cake may be washed with hot water to increase its purity and then be discharged as crude naphthalene. This material is suitable for phthalic anhydride manufacturing. Further distillation, followed by various washes, re-distillation or sublimation yields the refined product. Naphthalene can be produced by dehydrogenating methyl naphthalenes found in petroleum refinery streams but, at the time of the hearing in 1961, all of the naphthalene produced in Canada was from coal-tar sources. Naphthalene from petroleum has assumed a significant position in the U.S.A., and the view was expressed that the rate of growth in consumption of naphthalene in Canada might, particularly if export opportunities existed, permit the establishment of petro-naphthalene facilities in Canada.

In 1961, there were three producers in Canada with primary distilling facilities for naphthalene: Northern Tar and Chemical Company Limited at Port Arthur, Ontario; Algoma Steel Company Limited, Sault Ste. Marie, Ontario; and Domtar Chemicals Limited (formerly Dominion Tar and Chemical Company Limited) at Sault Ste. Marie and Hamilton, Ontario, Montreal, Quebec and Sydney, Nova Scotia. Only Domtar had facilities for making refined naphthalene; these were located at Toronto, Ontario.

The production of naphthalene is part of a production complex using the middle and heavy fractions of coal-tar. As explained by Domtar, in terms of the company's operations, the four primary plants produced refined tar, chemical oils, creosote, pitches and various grades of pitch coke. In the Toronto plant, the chemical oils are processed into various tar acids, naphthalene and phthalic anhydride. The company's estimates of the total Canadian market and production for the various products, together with data on the company's own production in 1960, are given in the following table.

<u>Product</u>	<u>Unit</u> (^{'000})	<u>Canadian</u> <u>Market</u>	<u>Canadian</u> <u>Production</u>	<u>Domtar</u> <u>Production</u>
1. Creosote	gals.	9,000	9,000	8,000
2. Refined tar	gals.	3,000	3,000	1,500
3. Pitch	tons	195	130	108
4. Pitch coke	tons	3	3	2
5. Tar acids	gals	..	500	500
6. Naphthalene finished	lb.	26,000	20,000	20,000
7. Phthalic anhydride	lb.	24,000	18,000	13,000

At that time, as the above table indicates, Canadian consumption of naphthalene was estimated to be about 26 million pounds which, at about four cents a pound, would have a commercial value of approximately one million dollars. Production in Canada was said to be about 20 million pounds, with imports supplying the balance. The Board was informed that 20 per cent of the coal-tars produced in Canada were not being processed to naphthalene; if these were processed, there would be sufficient naphthalene from Canadian sources to satisfy Canadian demand. Capacity in Canada was said to have been sufficient to meet demand until the late 1950's, but another producer of phthalic anhydride started production with an estimated requirement of six million pounds of naphthalene per year. Canadian capacity for naphthalene was inadequate to supply this new demand. This producer has since ceased manufacturing phthalic anhydride, but Domtar's own captive requirements for naphthalene increased after 1961 with the opening of the company's new phthalic anhydride plant.

Production of phthalic anhydride accounts for over 80 per cent of Canada's consumption of naphthalene and, following the shut-down of the Reichhold Chemical facilities, the only producer of the anhydride in Canada has been Domtar. Howards and Sons (Canada) Limited has announced plans to construct a plant at Cornwall, Ontario to produce phthalic anhydride. Because, however, the Howards' plant will use ortho-xylene as the raw material, it will not enhance the demand for naphthalene, and could have a bearing on the feasibility of establishing petro-naphthalene facilities. Phthalic anhydride is discussed in the section of the report on heading 29.15.

Domtar indicated that 10 to 15 per cent of its production of naphthalene was sold, the remainder being used in the company's production of phthalic anhydride. The market in Canada for the refined naphthalene was estimated to be about three million pounds which, at about 10 cents a pound, would have a commercial value of \$300,000. Imports of refined naphthalene were reported to be negligible after Domtar began to supply the product to the Canadian market in 1960. A substantial part of Domtar's sales of refined naphthalene was to Record Chemical Company Inc. This company refines the naphthalene to an even higher purity as required for moth-proofing and for certain insecticidal, tanning, sanitation and pharmaceutical uses. The naphthalene is mechanically processed by the company into chip, flake and ball form, some of which the company makes into consumer products, such as moth-proofing materials, and some it sells to other manufacturers.

Imports of naphthalene, as the following table indicates, have fluctuated considerably from about three or four million pounds to about 10 million pounds, with changes in the value of imports bearing no direct relationship to the changes in quantity imported. Very little refined naphthalene appears to be imported. The variations in quantity and value of the imported forms undoubtedly reflect the rapid shifts which take place throughout the world in supply of and demand for the product as well as reflecting changes in the supply of and demand for the coal-tar and coal-tar oils. Imports in most of the recent years have been mainly from the Benelux countries and Western Germany, with the U.S.S.R. being a significant supplier intermittently. In 1964, however, the U.S.A. supplied over 60 per cent of the imports. Smaller quantities are imported from the United Kingdom and, occasionally, Poland.

Imports of Naphthalene
1956-1964

<u>Year</u>	<u>Quantity</u> '000 lb.	<u>Value</u> \$'000	<u>\$/lb.</u>
1956	3,023	264	.087
1957	2,976	173	.058
1958	8,354	324	.039
1959	8,193	505	.062
1960	4,417	613	.139
1961	3,407	531	.156
1962	10,136	439	.043
1963	9,070	329	.036
1964	3,024	109	.036

Source: D.B.S., Trade of Canada, Imports - 1964, s.c. 406-31, formerly s.c. 8408

No exports of naphthalene, other than perhaps some refined naphthalene, were reported to the Board. U.S.A. statistics on imports from Canada, however, do record sizable entries from Canada in some years. The volatility of these exports reflects in part periods of unusual shortages in U.S. supplies as well as periods in which Canadian capacity was fully committed to Canadian requirements. It will be noted that the exported naphthalene is relatively crude which, the Board was informed, is entered in the U.S.A. duty-free. Some exports of refined naphthalene and its products were said to be possible from time to time, chiefly to countries other than the U.S.A.

Exports of Naphthalene^(a) to the U.S.A.

	<u>Net Quantity</u> lb.	<u>Value</u> \$U.S.	<u>\$/lb.</u>
1959	685,080	45,820	.07
1960	6,724,290	405,626	.06
1961	1,210,027	57,110	.05
1962	610,236	26,052	.04
1963	-	-	-
1964	40,000	720	.02

(a) Naphthalene solidifying under 79°

Source: U.S. Department of Commerce, Bureau of Census; United States Imports of Merchandise for Consumption, s.c. 8010080

In addition to naphthalene, there are some exports of the tar oils, tar acids and phthalic anhydride associated with naphthalene in the course of production. A spokesman for Domtar noted:

"Under tar acids, I would say that the imports about equal the exports, which are maybe 25 percent of the Canadian production. Phthalic anhydride -- well, that will change depending on what the international market is, and there are times when we are shipping as much across the Atlantic as is coming in that way; that is another problem which will come up, but there is ample supply available most of the time.(1)

"We don't export naphthalene, the chemical; we have exported the very crude naphthalene, like one of the oils which have naphthalene in them under conditions which have existed during the past year and on odd occasions in the past when there was a shortage of it, and we didn't have refining facilities sufficiently large to extract all of the naphthalene. There was the U.S. steel strike and that sort of thing which created a demand in the United States and they extracted the naphthalene from it. Had we had the facilities we would have done it here."(2)

The rapid changes which have taken place in past years in the supply of and demand for naphthalene in various countries of the world have been reflected in the price of the product. It is probable that the advent of petro-naphthalene, together with the production of phthalic anhydride from ortho-xylene, has tended to create greater price stability for naphthalene. The spokesman for Record Chemicals commented on the longer term price situation:

(1) Transcript, Vol. 40, p. 6052-3

(2) Same, Vol. 41, p. 6089

"Back in 1937 ... [the price] started sometimes at 2.6 cents and the refined was quoted at 4 cents ... it reached a level during the Korean crisis up to a 17 and 18 cents limit, and last year [1960] -- due to the low steel production -- it reached 28 cents per pound." (1)

The spokesman for Domtar remarked upon the effect of supplies from Russia on the U.S. and Canadian market, as follows:

- Q. "You discuss the dangers of extreme competition and attendant depressed prices. Has there been any evidence so far of the occurrence of this unhappy situation?"
- A. "Not from the United States, but it has occurred from Russia. About three years ago [about 1958] the Russians flooded the market with naphthalene, and the world price at that time, I would say, was possibly in the order of 5¢ per lb., and the Russian material was offered at 3¢ per lb. This completely upsets the Canadian market, or any other market, for that matter." (2)

Prices of Naphthalene, U.S.A.,
Selected Years, 1952 - 1965

	Crude Domestic ^(a) 78°	Refined ^(b) , Industrial chipped or crushed
	- U.S. ¢ per lb. -	
1952	.0675	.1075
1954	.05	.1050
1956	.07	.1175
1958	.07	.1250
1960	.05	.0975
1961	.062	.135
1962	.0525	.1325
1963	.0525	.1325
1964	.0325	.105
1965	.0325	..

(a) Crude, domestic, tank cars, freight equalized

(b) Refined, in bags, freight equalized

Prices are the published low for years 1952-61; March quotations for 1962-65

Source: Oil, Paint and Drug Reporter

(1) Transcript, Vol. 41, p. 6117

(2) Same, Vol. 41, p. 6090

Tariff Considerations

Naphthalene is made in Canada. It is entered under tariff item 711 at 15 p.c. under the British Preferential Tariff and 20 p.c. under the Most-Favoured-Nation Tariff. It may also be entered free of duty, from both B.P. and M.F.N. countries, under end-use items such as 219a, 791, 851 and 921. Almost all imports are entered duty-free under the M.F.N. Tariff.

Four representations were received which dealt specifically with the rates of duty for naphthalene. Domtar proposed that the product be dutiable at 15 p.c., B.P., 20 p.c., M.F.N., the rates nominally provided for the product, when ruled made-in-Canada, under item 711. These rates would then apply except to the extent that end-use provisions prevailed. The company would delete end-use provisions. Record Chemical Company, Inc. also proposed rates of 15 p.c., B.P., 20 p.c., M.F.N. for the naphthalene of heading 29.01. The Industry Committee later submitted that naphthalene of heading 29.01 should have a crystallizing point not below 72°C. Imperial Oil Limited proposed only that careful consideration be given to future tariff rates on naphthalene to ensure that the existing duty-free entry into the U.S.A. of naphthalene with a solidifying point under 79°C should not be jeopardized. Moran Chemical Company Limited, an importer of naphthalene, expressed an interest in the product under tariff item 219a. At the hearing of November 22, 1962, the company indicated that its interest was in refined naphthalene; it wanted the tariff treatment of existing item 219a(2) to be continued both for naphthalene and paradichlorobenzene.

Domtar Chemical Company Limited supported its proposal for rates of 15 p.c., B.P., 20 p.c., M.F.N. principally on the grounds that the Canadian producer was threatened in the Canadian market by the possibility of imports of naphthalene at very low prices either from surplus capacity which appeared to be building up in the U.S.A., or from European surpluses. The rates also were supported in the interest of protecting the entire complex of products of which naphthalene is an integral part. Imports at the time of the hearing were not causing hardship, but the company foresaw the possibility that, in the future, low-priced imports might threaten its position.

Record Chemicals indicated that its support for these rates was essentially in agreement with the customary position of the Industry Committee. The provision of a rate of 15 per cent under the B.P. Tariff would, in the company's view, have no immediate significance because the United Kingdom was using all of its available naphthalene.

Imperial Oil appeared to be favouring duty-free entry for naphthalene, or at least no increase in rates of duty. This position was also favoured by Moran Chemical Company Limited in the context of that company's own special interest under item 219a(2).

The Industry Committee's classification proposal was made at the hearing of May 23, 1961, and was not discussed as part of the representations on naphthalene. A crystallization point of 72°C would allow, under the heading, material of relatively low purity. The proposal was apparently in line with the Committee's recommended

criterion of 50 per cent by weight for benzene, toluene or xylene, rather than the 90 per cent which was alternatively proposed for these products. Most of the discussion at the hearing was concerned with commercial naphthalene with crystallization points of 78°C or higher, though naphthalene with a melting point of 74°C was said to be suitable for making phthalic anhydride, the major outlet for naphthalene. As noted above, a melting point of 78°C represents a purity of about 95 per cent.

Styrene

Styrene, also known as styrol, styrolene, cinnamene, cinnamol, phenylethylene, or vinyl benzene, is a colourless to yellowish oily liquid. It is insoluble in water but soluble in alcohol, ether, methanol, acetone and carbon disulphide. When heated or exposed to light it readily undergoes polymerization, becoming increasingly viscous until a clear solid is produced. It boils at 145°C.

The production of styrene may commence as a continuous operation with the alkylation of benzene with ethylene, a process which yields ethyl benzene, or it may commence with ethyl benzene. When it is made from ethylene and benzene, the purified ethyl benzene is catalytically dehydrogenated at about 630°C to form styrene. This is the method used by Dow Chemical of Canada Limited. When made by the second process, the ethyl benzene is oxidized to acetophenone which is hydrogenated to phenyl ethyl alcohol, which in turn is dehydrated to styrene. The latter process tends to be economic only when there are commercial outlets for the intermediates, acetophenone and phenyl ethyl alcohol, which can be removed at appropriate points in the process.

There are only two companies producing styrene in Canada, Dow Chemical of Canada, Limited and Polymer Corporation Limited. Both plants are at Sarnia, Ontario, and total capacity at the time of the hearing in 1961 was estimated by Dow at 100 to 150 million pounds per year.⁽¹⁾ Each of these plants is apparently of sufficient size to enjoy the advantages of large scale operations to much the same extent as plants in other countries. Total capacity in the United States is expected to approach three billion pounds in 1965.⁽²⁾

Most of the styrene produced in this country is used captively. At the time of the hearing there were said to be only two companies that purchased styrene for use in large volume.

Styrene has been an article of commerce on a major scale in Canada since the late 1940's, but in the past three or four years its use has experienced particularly rapid growth, principally as a result of the growing demand for synthetic resins and synthetic rubber.

Styrene consumption in Canada in 1963 has been estimated at about 150 million pounds, some 10 or 15 million pounds higher than in

(1) Transcript, Vol. 41, p. 6132

(2) Oil, Paint and Drug Reporter, January 6, 1964

1962.⁽¹⁾ At the published price of about 10 cents a pound, the commercial value of this volume of styrene would be approximately \$15 million. Later estimates put 1964 consumption at 160 million pounds per year, an indication that the rapid expansion in use has continued,⁽²⁾ paralleling developments in the U.S.A. The same trade source estimated that production of styrene by Polymer and Dow had been in the order of 165 million pounds in 1964, with exports of 10 million pounds being partly offset by imports of five million pounds.

In 1960, about 45 per cent of the styrene was apparently used to make polystyrene resins,⁽³⁾ by Dow, Monsanto and Kayson Rubber and Plastics Limited. This use has been increasing rapidly. Another 40 per cent in 1960 was said to be used to make the synthetic rubber, SBR (styrene-butadiene); this use has probably increased since 1960 at about the same rate as the total consumption of styrene. A newer use is in the manufacture of ABS (acrylonitrile-butadiene-styrene) synthetic resin. The Canadian demand for ABS resin in 1963 was approximately five million pounds;⁽⁴⁾ the product was not made in Canada in that year, and this demand was met by imports. However, three companies are understood to have begun production in Canada in 1964 and, since the demand for ABS resins is expected to increase rapidly, they are likely to become another important outlet for styrene. These resins are discussed in the section of the report on Chapter 39. Other uses of styrene are for alkyds and resins used in paints and varnishes.

Uses for Styrene

<u>Use</u>	<u>Approximate Percentage of Total Consumption in 1960</u>	<u>1964</u>
Polystyrene plastic resin	45	52
Synthetic resin latex	6	-
Polyester resins	5	-
Polystyrene foam	4	-
ABS resin	-	4
Styrene-butadiene rubber	40	44

Source: 1960, Transcript, Vol. 41, p. 6133; 1964, Canadian Chemical Processing, February, 1965, p. 70

Imports have never provided serious competition to domestic producers. The only known imports in recent years were in 1959 when Dow Chemical was said to be importing to make up deficiencies in

(1) Canadian Chemical Processing, February, 1964, p. 47

(2) Same, February, 1965, p. 7

(3) Transcript, Vol. 41, p. 6133

(4) Chemistry in Canada, March, 1964, p. 21

supply caused by a strike at Polymer Corporation's plant. The duty on imports going into the U.S.A. was said to exclude Canadian producers from that market, but they do ship styrene to England by bulk tanker and in drums. There is no public information on exports although there are known to be exports of styrene and of some of the products made from it.

List prices for styrene are comparable in the United States and Canada. However, a direct comparison is of little significance because large-volume consumers have contractual price arrangements with the producers at lower than published prices. It is of some interest to note that in March, 1964, the price of styrene in the U.S.A. dropped to an all-time low, up to that time, of 9.5 cents a pound.⁽¹⁾

Published Styrene Prices,
Canada and the United States,
1959 - 1965

<u>Year</u>	<u>Canada</u> ^(a) - Cents per pound	<u>U.S.A.</u> ^(b) -
1959	13.0	12.7
1960	12.5	12.7
1961	12.25	12.6
1962	11.0	10.8
1963	11.25	10.5
1964	11.25	9.5
1965	10.50	8.0

(a) Canadian prices, tank cars, freight allowed

(b) U.S. prices, 99.2%, tank cars, f.o.b., freight equalized;
Canadian prices based on July data; U.S. prices 1959-1961,
annual high; 1962-64, March average; 1965, May average

Source: Canadian Chemical Processing; Oil, Paint and Drug Reporter

Tariff Considerations

Styrene is dutiable under tariff item 711, as an unenumerated article, at rates of 15 p.c., B.P., 20 p.c., M.F.N. It may also be entered free of duty under item 851 when for use in the manufacture of synthetic rubber.

Dow Chemical of Canada Limited proposed that the rates of duty for styrene be 15 p.c., B.P., 20 p.c., M.F.N. as applicable under item 711. Polymer Corporation Limited took no stand with respect to the rates on styrene except to state that the company's proposal for free entry for benzene was not intended to cover vinyl benzene

(1) Oil, Paint and Drug Reporter, April 13, 1964, p. 37

(styrene).(1) Retention of the provision of item 851 would, however, enable Polymer to import styrene duty-free for the manufacture of synthetic rubber. Naugatuck Chemicals Division of Dominion Rubber Co., Limited, included styrene in a list of products in which the company had an interest as a user. It did not take issue with the rates proposed by the producers of these materials provided that the Board also recommends the rates requested by the company on the products which it manufactures.(2)

No arguments were presented in support specifically of the proposed rates on styrene. Dow Chemical urged more generally that the proposed level of protection was appropriate for chemicals in order to encourage production in Canada by ensuring that producers have an opportunity of supplying the domestic market.

II UNSATURATED ACYCLIC HYDROCARBONS

(Acetylene, butadiene, butylene, ethylene, propylene)

A second main group of petrochemicals is produced by a cracking process from large volume refinery streams such as naphthas and gas oils. The principal products from this process are butadiene, butylene, ethylene and propylene. By-product streams which result may be returned to other process units for conversion to gasoline, heating oil and other fuel products. Acetylene, another important unsaturated acyclic hydrocarbon, differs somewhat in basic molecular structure from the four mentioned above. It can be produced by the decomposition of such petroleum hydrocarbons as natural and refinery gases, but production of acetylene in Canada is from calcium carbide.

Acetylene

The Product and Method of Manufacture

Acetylene, a colourless gas, is one of the most important olefinic, or unsaturated acyclic, hydrocarbons. It burns in air with a sooty flame but is explosive when mixed with air in proportions ranging from 3 to 65 per cent acetylene. Odourless when pure, it ordinarily has a garlic-like odour due to impurities. It is soluble, in varying degrees, in acetone, alcohol, water and liquid ammonia

Of the two methods of manufacture, the one used in Canada involves the controlled reaction of calcium carbide and water. An increasing proportion of acetylene requirements in other countries is being produced by the decomposition of such petroleum hydrocarbons as natural and refinery gases. Of a total of 950 million pounds produced during 1963 in the United States, some 337 million pounds were reported to have been made from petroleum hydrocarbons;(3) output of

(1) Transcript, Vol. 41, p. 6155

(2) Same, Vol. 6, p. 899-900

(3) Oil, Paint and Drug Reporter, April 27, 1964

hydrocarbon acetylene is said to be increasing rapidly in the U.S.A., with capacity from these sources placed at nearly 650 million pounds in late 1964.⁽¹⁾ Similarly, capacity to produce acetylene from petroleum is being developed in Britain. Half the cost of the calcium carbide process is said to be for electricity, which is relatively high-cost in Britain.⁽²⁾ This new development is of interest, moreover, because of the possibility of making acetylene for less than five cents per pound from natural gas.⁽³⁾ The only by-product, hydrogen, is separated in the petroleum process, and is likely to have commercial value. For some uses acetylene has been regarded as an expensive material compared with ethylene; its derivation from petroleum hydrocarbons might, therefore, reduce or offset its unfavourable cost comparison in some uses.

The Industry and the Market

Because of its explosive nature, especially when mixed with air, acetylene is usually transported under pressure in special steel cylinders. The cylinders, made in the United States but not in Canada, contain porous charcoal or sand-lime impregnated with acetone which will absorb 300 times its own volume at a pressure of 12 atmospheres. Their sturdy construction and their contents result in the cylinders being heavy and the cost of freight substantial. To circumvent some of the cost of transportation, acetylene is usually generated from calcium carbide at or near the site where it is to be consumed.

In Canada, as far as is known, no acetylene is produced from hydrocarbons and only two companies produce the calcium carbide from which acetylene is generated. These are Shawinigan Chemicals Limited at Shawinigan, Quebec and Cyanamid of Canada Limited, at Niagara Falls, Ontario. About 90 per cent of the calcium carbide produced by these two plants is used captively in the production of organic chemicals.⁽⁴⁾

Generating plants which use calcium carbide to produce acetylene gas for industrial use vary from small portable units which generate the gas at the point of use to relatively large installations which generate the gas and fill cylinders under high pressure for distribution to oxy-acetylene welders. Companies which produce acetylene for sale in cylinders ordinarily also produce and sell compressed oxygen in cylinders and in some cases other industrial gases as well.

In 1964, there were four companies in Canada which sold acetylene in cylinders: Canadian Liquid Air Company Limited, Canadian Oxygen Limited, Liquid Carbonic Canada Limited and Union Carbide Canada Limited. The operations of these companies and the characteristics of the compressed gases industry are discussed more fully under heading 28.04 where the other principal compressed gases are presented.

(1) Oil, Paint and Drug Reporter, October 12, 1964, p. 9

(2) The Economist, London, Feb. 15, 1964, p. 635

(3) Chemical Week, Nov. 21, 1964, p. 89

(4) A more detailed discussion of calcium carbide is presented in the section of the report dealing with the product under heading 28.56

The distribution of acetylene generating plants is shown in the table which follows. Two of the companies, Canadian Liquid Air and Union Carbide, sell acetylene at a large number of locations; the other two, Canadian Oxygen and Liquid Carbonic, have a more limited regional distribution. Of the 43 plants known to be in operation in 1964, the two major distributors operated 36 establishments.

Distribution of Plants Generating Acetylene Gas for Sale,
by Province, 1964

	<u>Canadian Liquid Air</u>	<u>Canadian Oxygen</u> no. of plants	<u>Liquid Carbonic</u>	<u>Union Carbide</u>
Newfoundland	1	-	-	-
Nova Scotia	2	-	-	1
New Brunswick	1	-	-	1
Quebec	3	1	-	5
Ontario	4	1	1	3
Manitoba	1	-	-	2
Saskatchewan	1	-	1	1
Alberta	2	-	-	2
British Columbia	<u>5</u>	<u>1</u>	<u>2</u>	<u>1</u>
Canada	20	3	4	16

Source: Tariff Board Correspondence, July - August, 1964

In all of its principal uses, acetylene encounters growing competition from other materials. The situation in Canada, however, differs from that in the U.S.A., and it is well to note briefly the situation in the latter country before turning to that in Canada. Between 1961 and 1964, the use of acetylene in the U.S.A. increased rapidly, with expectation of continued expansion over the next few years. This seemed to follow, at least in part, because of the increasing supplies which are being produced at low cost from hydrocarbons. Much of this supply is used captively by the producing companies. The principal uses in the U.S.A. were reported to be for vinyl chloride monomer (36 per cent of total), acrylonitrile (32 per cent), vinyl acetate monomer (14 per cent), neoprene rubber (9 per cent), acrylates and other (9 per cent).⁽¹⁾ Each of the principal end-products can be reached by other routes, starting particularly with ethylene, propylene and butadiene. Thus, the growth in the use of acetylene depends not only upon the growing use of the end-products, but also upon the competitive strength of acetylene compared with the other raw materials, particularly ethylene.

In Canada, acetylene for industrial uses is supplied chiefly by the compressed gases industry. The demand fluctuates from year to year, but has not shown appreciable growth in recent years. The uses

⁽¹⁾ Oil, Paint and Drug Reporter, October 12, 1964, p. 9

which the widely scattered compressed gas plants serve are chiefly in the metal working industries where acetylene is used in cutting, brazing, welding and hardening metals. In many of these uses it competes with propane and natural gas, especially at places near the source of the cheaper, though less efficient, gases. Electric arc-welding also serves some of these requirements.

At the public hearing on acetylene, in May 1961, the spokesman for Union Carbide, speaking of these industrial applications, observed that the acetylene industry is essentially a service industry.⁽¹⁾ This becomes more evident when the commercial market for acetylene of seven or eight million dollars is compared with the cost of the calcium carbide, from which it is produced, of about two million dollars annually.

Shipments of Acetylene by the Compressed
Gases Industry, 1957 - 64

	<u>'000 cu. ft.</u>	<u>\$'000</u>	<u>\$/ '000 cu. ft.</u>
1957	195,838	7,304	37
1958	180,973	6,772	37
1959	184,916	7,200	39
1960	209,480	7,849	37
1961	182,777	6,968	38
1962	192,492	7,236	38
1963	197,463	7,690	39
1964	226,166	..	..

Source: D.B.S., Manufacturers of Industrial Chemicals, Cat. No. 46-219

Perhaps 90 per cent of the total production of acetylene in Canada is used captively by Shawinigan Chemicals, Shawinigan, Quebec, in chemical uses somewhat analogous to those cited above for the U.S.A. Acetylene, in this captive use, is manufactured into intermediate products from which, in later stages of production, many synthetic resins and other chemicals of substantial commercial importance are made. The following are some of the intermediate products from acetylene and the uses to which they are ultimately applied. The intermediate products are discussed in the sections of the report dealing with the corresponding B.T.N. headings.

⁽¹⁾ Transcript, Vol. 36, p. 5317

Some Acetylene Derivatives and Their Uses

<u>Product</u>	<u>B.T.N. Heading</u>	<u>Some Ultimate Uses</u>
Vinyl acetylene	29.01	Rubber industry; coatings; linings
Vinyl chloride	29.02	Plastics; coatings
Vinyl acetate	29.14	Plastics; surface coatings
Trichloroethylene	29.02	Dry cleaning; degreasing
Acrylonitrile	29.27	Resins; fibres; synthetic rubber; plastics
Acrylic esters (Monomers)	29.14	Plastics, coatings; textiles; leather finish
Acetylene black	28.03	Rubber compounding; dry cells; pigments
Acetaldehyde	29.11	Acetic acid; pentaerythritol; weed killers; vinyl acetate
Acetic anhydride	29.14	Plastics; fibres

Speaking of the rate of growth in the use of acetylene, at the public hearing in May 1961, the spokesman for Shawinigan Chemicals said, "It is a steady but unspectacular growth ... the growth of the company and the use of the material, it is the same thing."⁽¹⁾ Since that time, however, Shawinigan Chemicals has built a new plant at Varennes, Quebec designed to produce some of the related chemical intermediates from a hydrocarbon feedstock derived from petroleum. Of these intermediates, acetaldehyde for vinyl resins is understood to be the most important. Thus, the company which has very largely been responsible for any increases in output of acetylene in Canada is now in a position to use an alternative route, particularly through acetaldehyde, to many of its important products; it can therefore largely determine whether, in its substantial chemical uses, acetylene will continue to experience increases or will decline.

Another use of acetylene, which was noted with respect to the U.S. situation, was for the production of acrylonitrile which, in turn, is an important intermediate chemical in the manufacture of synthetic rubber, resins and other end-products. Acrylonitrile has not been made in Canada in the past, so that any part of the increased use of acetylene in the U.S.A. which resulted from a growing demand for acrylonitrile would not be reflected in a similar development in Canada. Imperial Oil Limited has announced that it will produce acrylonitrile at Sarnia, Ontario, but indications are that the process will not use acetylene as the starting material.

On balance, therefore, there appears to be a fairly stable demand for acetylene as produced by the compressed gases industry for metal working uses, and the likelihood of no appreciable increase, and possibly of some decline, in its chemical uses in Canada. The situation, because of the differences in chemical use and the way in which hydrocarbon feedstocks are converted to final products in Canada, contrasts with the buoyant demand for acetylene envisaged in the U.S.A.

(1) Transcript, Vol. 36, p. 5334

The major use of acetylene by Shawinigan Chemicals is in Quebec; in addition, the principal market areas for acetylene are in Quebec and Ontario. The distribution of the market can be seen from the distribution of sales of calcium carbide from which acetylene is produced. A spokesman for Shawinigan Chemicals estimated the distribution of sales of calcium carbide, in 1961, as follows:(1)

<u>Region</u>	<u>Per Cent of Sales</u>
Atlantic Provinces	8
Quebec	28
Ontario	36
Prairies	17
British Columbia	<u>11</u>
	100

The above data exclude the captive use of calcium carbide by the two producers. On the basis of total use (commercial and captive), well over 90 per cent of Canadian consumption of calcium carbide and of acetylene is in Quebec and Ontario.

In the commercial market, acetylene is usually sold in cylinders which may be owned by the supplier or by the user of the gas. Acetylene is priced f.o.b. plant and the buyer pays the cost of freight for cylinder and gas, as well as the return freight on the empty cylinder. The cylinder weighs many times more than the gas which it contains, and the cost of the two-way freight on the cylinder will generally exceed by a substantial amount the factory price of the gas itself, except perhaps in very short local hauls.

The freight costs in the distribution of acetylene in cylinders limit the distance the gas can be shipped economically and account for the establishment of plants near points of use. The transportation factor was said to more than offset potential economies that might be achieved if there were fewer but larger plants.

As a result of the limited distances that acetylene can be shipped economically, active competition tends to be restricted to plants that are relatively close to each other. An important factor in the extent and nature of the competition is that calcium carbide can be shipped at very much lower cost than equivalent quantities of acetylene.

The significance of transportation costs in the location of small-scale local plants is illustrated in a statement by a spokesman for Union Carbide, following a reference to the three plants serving the Montreal area.

"There is another plant at Lauzon and also another competitive plant at Quebec City across the river, and that is about the distance which you would normally ship acetylene. You wouldn't build a plant bigger than would take care of the area in which it may be economically shipped."(1)

For the reasons outlined above, foreign trade in acetylene is virtually non-existent; the foreign trade that occurs is in the more readily-shipped raw material, calcium carbide. The section of the report dealing with calcium carbide indicates that Canadian producers export far more of this product than is imported. Cost of transportation and the services involved in distributing acetylene in cylinders, particularly to small producers, would tend to limit foreign trade to points at which relatively large consumers of acetylene are located close to the border.

The limitations which transportation costs impose upon imports were noted in the following statement by the spokesman for Union Carbide.

"Boston ... couldn't possibly compete in St. John, New Brunswick nor, in fact, at any point in New Brunswick. It would be very difficult for a plant at Albany or Syracuse to compete in the Montreal area."(2)

Partly because acetylene is not traded widely, price information is not readily available. The average value of shipments recorded in the earlier table was \$37 to \$39 per thousand cubic feet. This might be something in the order of 50 cents per pound as shipped in cylinders. These average values of cylinder shipments in Canada, however, cannot be compared directly with the quoted U.S. prices. A report on prices in the U.S.A. estimated that the "probable average internal cost for captive plants ranges from about 10 cents/lb. for a small plant to 5.25 cents/lb. for a large plant; the latter cost depends on off-gas utilization. Tariff Commission reported an average selling price of 10.3 cents/lb. on 14.4 million pounds in 1963".(3)

The difference in prices in Canada and the U.S.A. was reported to be far less than the above comparison might suggest. In commenting on prices in Canada and the U.S.A., the spokesman for Union Carbide Canada Limited noted that "prices in Canada are less than 15 per cent higher, by and large, than the prices in comparable places in the United States".(4) The spread between prices in the two countries was characterized as "moderate". The higher Canadian price was attributed to the cost of transporting the raw material, calcium carbide, to the acetylene plant; to the higher equipment cost in Canada, owing to the need to import the production and distribution equipment from the United States and to pay import duties on it, and also to the smaller-scale operations of the Canadian plants. These comparisons were being made f.o.b. supplier's plant. It was pointed out that in some locations the laid-down cost to the user might be less in Canada

(1) Transcript, Vol. 36, p. 5352

(2) Same, Vol. 36, p. 5355

(3) Oil, Paint and Drug Reporter, October 12, 1964, p. 9

(4) Transcript, Vol. 36, p. 5342

than that to a user in a neighbouring location in the U.S.A.

" ... There are points, for instance, where Canadian acetylene has a lower value and a lower sales price than that immediately across the border ... "(1)

Tariff Considerations

Acetylene is entered as an unenumerated product under tariff item 711, with rates of 15 p.c., B.P. and 20 p.c., M.F.N.

At the public hearing, in May 1961, two producers and distributors of acetylene urged that there be no change in the existing rates. These companies were Canadian Liquid Air Company Limited⁽²⁾ and Union Carbide Canada Limited⁽³⁾, the two largest national distributors of acetylene. They were supported by Shawinigan Chemicals Limited.⁽⁴⁾

The Canadian Pulp and Paper Association expressed its interest in acetylene and strongly opposed "any revision which results in an increase over current tariff rates, either now or in the future, in respect of chemicals used by the pulp and paper industry."⁽⁵⁾

No other representations were made to the Board relating specifically to acetylene.

Union Carbide and Canadian Liquid Air supported their proposals mainly on the basis of higher costs of production and distribution in Canada and on the claimed vulnerability of about 40 per cent of the Canadian market to competition from producers in the U.S.A. They also referred to the larger and more concentrated market in the U.S.A. which permitted producers in that country to achieve economies of scale not available to producers in Canada.

The spokesmen for the companies noted that the two principal materials, calcium carbide and the acetone used in the cylinders to absorb the acetylene in shipment, are dutiable at rates of 20 p.c. and 25 p.c., M.F.N. respectively, and cost more in Canada than in the U.S.A. They also said that generators and compressors were not made in Canada and cost 25 per cent more than in the U.S.A. Also, cylinders in which acetylene is distributed are not made in Canada and are dutiable at 25 p.c., M.F.N., if imported empty.

Union Carbide and Canadian Liquid Air claimed that about 40 per cent of the Canadian market was within economic shipping distance of producers in the U.S.A. The spokesman for Union Carbide said:

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- (1) Transcript, Vol. 36, p. 5342
 - (2) Same, Vol. 36, p. 5360
 - (3) Same, Vol. 36, p. 5333
 - (4) Same, Vol. 36, p. 5314
 - (5) Same, Vol. 36, p. 5246

" ... any reduction in the present rate of duty would enable foreign manufacturers to compete successfully in these areas. It is unlikely that there would be any saving to the Canadian user if the duty were removed, but there would be substantial losses in employment, wages, salaries and taxes to the economy if this market were opened to foreign competition." (1)

Throughout the hearing on acetylene the producers placed major emphasis on the overriding importance of freight costs and of plant location close to major centres of consumption. The tariffs on generators, compressors and cylinders would tend to make Canadian costs of these items higher than their costs in the U.S.A. However, it is doubtful whether the additional cost of these, per unit weight of acetylene, would offset more than a small portion of the cost of dead weight that must be transported in the distribution of the gas.

According to the discussion at the public hearing most sales of acetylene are in relatively small amounts, in cylinders. The amount of service involved in supplying small amounts on short notice would give an advantage to suppliers with a well established distribution system in a local market in Canada. The ability to provide regular and reliable service to customers appeared to be of more significance in sales than potential savings in costs which might arise from a larger scale of operation. The discussion indicated that the large national distributors did not assign much significance to economies of scale when considering whether to establish a plant in a market area. Centres of substantial use frequently are served by more than one plant.

The support for rates of 15 p.c., B.P. and 20 p.c., M.F.N. by Shawinigan Chemicals was based on somewhat different considerations. Shawinigan Chemicals does not distribute acetylene in cylinders as do the members of the compressed gases industry. The great bulk of Shawinigan's production of acetylene is captive, although it also sells some acetylene via pipeline at Shawinigan. However, the company sells calcium carbide to the national distributors for production of acetylene, and so has an interest in cylinder sales of acetylene as an outlet for a portion of its calcium carbide.

However, the more important consideration to Shawinigan Chemicals arises from its production of many organic chemicals from acetylene; this interest was expressed in the following exchange.

Q. "In your brief you express some concern about the imports of acetylene. Is this concern one related largely to the products made from acetylene or to the competition of acetylene for direct sale in Canada?

A. "Well, I think what we were trying to get at here was just that we don't think the Board should ... set up a situation which would enable someone to short circuit a whole Canadian complex in Canada by running a pipeline across the border and just starting in at this stage of manufacture." (2)

(1) Transcript, Vol. 36, p. 5330

(2) Same, Vol. 36, p. 5312

Shawinigan Chemicals apparently considered it a possibility that, with lower rates of duty on acetylene, a producer in the U.S.A. might ship acetylene by pipeline to a plant in Canada for the production of resins and chemicals based on acetylene. This would be a real threat if acetylene could be produced in the U.S.A. at substantially lower cost at some appropriate border point. However, there would seem to be little possibility for such an operation unless an acetylene-using plant were also to be established on the U.S. side of the border. The locations at which such an arrangement could be successfully established are likely to be very few.

Shawinigan Chemicals is one of the world's largest producers of calcium carbide, and is a substantial producer of acetylene; it exports calcium carbide to the U.S.A. and to other countries. Even if acetylene were able to be imported duty-free, via pipeline, it is not clear why such an operation would necessarily involve lower costs than those of Shawinigan Chemicals. The only U.S. plant known to supply both sides of the border at the time of the hearing has since ceased operations, suggesting that factors other than location near the Canadian border were important for its survival.

Cyanamid of Canada Limited, the only other Canadian producer of calcium carbide, made no proposals with respect to rates of duty either for calcium carbide or acetylene. Cyanamid's location at Niagara Falls, Ontario is very near the plant of Union Carbide Corporation at Niagara Falls, New York and would seem to make it more vulnerable to the kind of competition envisaged by Shawinigan, though Cyanamid has little direct interest in acetylene.

The Canadian Pulp and Paper Association stated that "acetylene is used in industrial quantities by the pulp and paper industry in welding operations" and maintained that increased costs for the industry, arising from revisions of the Customs Tariff, should be avoided. (1) No increases from existing rates were proposed by companies coming before the Board.

Butadiene

The making of gasoline by cracking the distillate stream from primary refinery operations yields a mixture of hydrocarbons (including butadiene, butylene, ethylene and propylene) which may be subsequently separated in high purity for use by the chemical industry. Butadiene is a gas at normal temperature and pressure.

In Canada, a large proportion of all the butadiene is produced within the facilities of the Polymer Corporation Limited plant at Sarnia, Ontario, in the process of making synthetic rubber from butylenes. Butadiene is manufactured for sale by Imperial Oil Limited at Sarnia, Ontario, and it is contained in a butylene-butadiene mix which is a by-product of the Shawinigan Chemical Limited plant at Varennes, Quebec. This mix was reported to be shipped to Polymer at Sarnia who "probably can recover from it 20 to 30 million pounds per year of butadiene and thus back out a corresponding amount of import material." (2)

(1) Transcript, Vol. 36, p. 5248

(2) Canadian Chemical Processing, February, 1964, p. 47

Canadian consumption of butadiene was estimated before the Board to have increased from 120 million pounds in 1955 to 200 million pounds in 1961; this quantity would have a commercial value in excess of \$20 million. The principal use of butadiene is in the manufacture of synthetic rubber; some is also used in making butadiene-styrene resins. Synthetic rubber is not part of this study. Consumption of butadiene has no doubt increased appreciably since 1961, with the increasing demand for SBR rubber, and the requirements of the new facilities for manufacturing ABS (acrylonitrile-butadiene-styrene) resins.

No price information is available for butadiene in Canada. The published price in the U.S.A. declined from 15 cents per pound in 1956 to 11.75 cents per pound in 1964. The average value, at point of origin, of the butadiene imported into Canada in 1964 was approximately 8.5 cents per pound.

Butadiene has been imported from the U.S.A. and the U.K.; essentially all imports have been entered duty-free. Imperial Oil Limited estimated that imports supplied 10 to 12 per cent of Canadian consumption in 1961, and available data suggest that imports supplied a somewhat smaller proportion in 1964.

Imports of Butadiene
1955-1964

<u>Year</u>	<u>Total</u>	<u>U.S.A.</u> - \$'000 -	<u>U.K.</u>
1958	3,828	3,828	-
1959	1,695	1,695	-
1960	2,919	2,919	-
1961	3,008	3,008	-
1962	2,011	1,258	753
1963	3,695	2,328	1,367
('000 lb.)	('000 lb.)	('000 lb.)	
1964 24,460	2,104	15,369 1,437	9,091 667

Source: D.B.S., Trade of Canada, Imports; 1964, s.c. 40609; formerly s.c. 8428

Tariff Considerations

Butadiene has been ruled made in Canada effective May 24, 1966 and would be dutiable under tariff item 711 at 15 p.c. under the British Preferential Tariff and 20 p.c. under the Most-Favoured-Nation Tariff. However, almost all imports are entered free of duty under tariff item 851, as materials for use in the manufacture of synthetic rubber.

Imperial Oil Limited and Polymer Corporation Limited made representations before the Board on butadiene. Imperial recommended that this product be allowed entry free of duty regardless of its use;

Polymer supported the recommendation. Imperial Oil noted that "the bulk of such imports have been imported duty free under the 851 synthetic rubber end use item."⁽¹⁾

The arguments presented in favour of this proposal for butadiene by Imperial Oil were generally the same as those for ethylene, propylene, and butylene and are to be found in this report under "Ethylene".

With respect to the classification of butadiene in the Canadian Customs Tariff, the Industry Committee proposed that olefinic hydrocarbons, of which butadiene is one, be classified under an item worded like B.T.N. heading 29.01 when the products are of a purity of 90 per cent or more by weight, (See Appendix II). No opposition to this proposal was expressed before the Board, and there seemed to be agreement that the butadiene of commerce normally would be of very high purity, well above the minimum provision of the Committee's proposal.

Butylenes

There are four butylenes, gaseous under normal conditions of temperature and pressure. The properties of three of them (butylene-1; cis-butylene-2; trans-butylene-2) are so similar that they are commonly included under the term "normal butylenes". The fourth, isobutylene, has distinguishing properties, the chief of which is greater chemical activity.

Data on butylene capacity in Canada are not available. However large quantities of butylenes are produced as a by-product in the manufacture of gasoline and ethylene in the cracking operations of a petroleum refinery. The butylene mixture so produced may be separated into normal butylene and isobutylene, or used as a mixture for blending back into gasoline.

There are many refineries in Canada with cracking capacity capable of producing butylene. Imperial Oil Limited, for example, recovers butylene from the production of both gasoline and ethylene at Sarnia, Ontario, where Polymer Corporation Limited also produces most of its own requirements from streams obtained from nearby petroleum refineries and from Shawinigan Chemicals Limited at Varennes, Quebec.

In addition to the large amount of butylene blended into gasoline, the estimated consumption for chemical uses increased from 180 million pounds in 1955 to 240 million pounds in 1961.⁽²⁾ The commercial value of the butylene so used would probably be of the order of \$5 million. Although Imperial Oil's production was reported to be entirely for sale, the Board was informed that a high proportion of the butylene produced is neither bought nor sold but is produced by chemical companies for use in their own plants. Because of the nature of the source and market for butylenes, it may be concluded that adequate supplies are available from Canadian production.

(1) Transcript, Vol. 40, p. 5973

(2) Same, Vol. 40, p. 5969

Polymer Corporation uses isobutylene for making butyl rubber, and converts normal butylene into butadiene for other synthetic rubbers. In addition, normal butylene, by various processes, finds application in plastics and surface coatings, and small amounts are used for making amyl alcohol and secondary butyl alcohol for solvents.

Imports of butylene are understood to be insignificant, probably about \$100,000 a year. These imports would be from the U.S.A. There are no known exports.

No Canadian price data are published for the butylenes. In the U.S.A. the published price for normal butylenes has been about six cents a pound since 1960, the first date of publication. The published price of isobutylene is 38 cents a pound. These prices, however, are unlikely to apply to a very large portion of the butylene consumed either in the U.S.A. or in Canada.

Tariff Considerations

The butylenes may be entered duty-free under item 851, when for use in the manufacture of synthetic rubber, or be dutiable as liquified petroleum gases under item 275 at rates of 10 p.c., B.P. and 12½ p.c., M.F.N. Item 275 is not part of Reference 120.

Imperial Oil Limited recommended that butylenes should be imported free of duty regardless of their end use.⁽¹⁾ Polymer Corporation supported free entry because of its use in the manufacture of synthetic rubber.⁽²⁾ The arguments presented in favour of free entry are the same for butylene as for ethylene, and are discussed under that product.

With respect to the classification of the butylenes, the Industry Committee proposed that olefinic hydrocarbons, which include the butylenes, be classified under an item worded like B.T.N. heading 29.01 when the products are of a purity of 90 per cent or more by weight, (See Appendix II). No opposition was expressed to this proposal. This provision in the B.T.N. would classify mixtures of the isomers of butylene under the heading 29.01. Other mixtures, however, would be regarded as products of petroleum. In the Canadian Tariff, any butylene which is entered as liquefied petroleum gas under item 275 is outside the scope of this study. Item 275 could be re-located under the item proposed by the Committee without any change in its wording or rates of duty.

(1) Transcript, Vol. 40, p. 5973

(2) Same, Vol. 38, p. 5603

Ethylene

Ethylene (ethene), an olefinic hydrocarbon, is a colourless gas that burns with a luminous flame; it has a suffocating odour and strong anaesthetic properties. It liquifies at 0°C at a pressure of 42 atmospheres. One volume of ethylene mixed with 3 volumes of oxygen is explosive on contact with a flame or electric spark. It is soluble in acetone and benzene. Three grades are available:

- 1) Technical (normally 97-98 per cent pure)
- 2) Polyethylene grade (99.85 per cent by weight and free of acetylene)
- 3) U.S.P. (99 per cent pure)

When crude oil is fractionally distilled in a petroleum refinery, a group of light hydrocarbons is produced consisting of gases and volatile liquids. Among these, in addition to the four olefins of this section of the report, are methane, ethane and propane; ethylene typically comprises about 7 per cent of the stream. After this refinery gas has been cleansed of hydrogen sulphide and carbon dioxide, it is subjected to low-temperature fractionation to separate the ethylene and ethane. (The boiling point of ethylene is -155°F; that of ethane is -128.2°F.) The ethane is then cracked and recycled through the purification and fractionation units to yield additional ethylene. Similarly, the ethane part of a natural gas stream can be used to produce ethylene.

In addition to the refinery gas from the primary distillation stage, ethylene is also produced in the cracking process used to reduce the gas oils and naphthas to gasoline. Cracking of the naphthas has, in the past, yielded only small amounts of ethylene compared to the proportion of propylene and butylenes, but more recently "high severity" cracking has resulted in approximately doubling the yield.⁽¹⁾

While ethylene is only one of the products of these processes, other products (e.g. propylene) yielded by the same processes may be recycled and cracked to produce ethylene, thus providing a measure of control over production in conformity with market requirements.

It was estimated at the time of the public hearing in 1961 that the five plants then producing ethylene in Canada had a total capacity of 300 to 350 million pounds per year, of which 150 million pounds were reported to be at the Imperial Oil plant at Sarnia.⁽²⁾ However, since that time a number of increases in capacity have taken place and, in 1963, Shawinigan Chemicals Limited built a plant at Varennes, Quebec with an estimated annual capacity of 100 million pounds.⁽³⁾ In 1964, the published production of ethylene in Canada was 546 million pounds.⁽⁴⁾ This volume of production would have a commercial value in excess of \$25 million.

(1) Chemical Week, May 2, 1964, p. 50

(2) Transcript, Vol. 40, p. 6000

(3) Oil, Paint and Drug Reporter, July 1, 1963

(4) D.B.S., Specified Chemicals, Catalogue No. 46-002, December, 1964

Canadian Companies Manufacturing Ethylene

<u>Company</u>	<u>Location</u>
Canadian Industries Limited	Edmonton, Alberta
Dow Chemical of Canada Limited	Sarnia, Ontario
Imperial Oil Limited	Sarnia, Ontario
Polymer Corporation Limited	Sarnia, Ontario
Shawinigan Chemicals Limited	Varennnes, Quebec
Union Carbide Canada Limited	Montreal, Quebec

Ethylene capacity in the United States in 1964 was estimated at 8.65 billion pounds per year,⁽¹⁾ about 15 times the Canadian capacity.

With respect to the economies of large scale operation, the spokesmen for Imperial Oil Limited and for Dow Chemical of Canada maintained that Canadian production of ethylene is not a high cost operation, and is competitive with the industry in many parts of the United States. Imperial Oil's plant was said to be comparable in size with many in the U.S.A. On the other hand, there are plants in the United States each of which could produce nearly the total annual Canadian consumption; new plants under construction in the U.S.A. were said to have annual capacities of 400 million pounds or more. On the same point, the spokesman for Dow Chemical said, "There is no question that the investment per pound of production is less in a million pounds a day plant than it is in a quarter of a million a day plant, but this doesn't necessarily mean that the ethylene from it costs a significantly - a lot more... we have been forced to be more efficient."⁽²⁾

Compared with the volume of ethylene used in Canada, commercial sales of the product are relatively small, probably not more than 20 per cent of total production. Factory shipments, including some captive use, were estimated at over 500 million pounds in 1964.⁽³⁾

At the time of the hearing in May, 1961, the spokesman for Imperial Oil Limited stated that his Company was the only one in Canada producing ethylene for sale in large volume and at high purity. The company stated that all of its production of ethylene is for merchant use and that sales are made to Dow Chemical of Canada Limited, Du Pont of Canada Limited, Union Carbide of Canada Limited and to Ethyl Corporation of Canada Limited.⁽⁴⁾ Since mid-1963, however, Shawinigan Chemicals Limited has undertaken the production of ethylene at its Varennes, Quebec, site, chiefly for captive use, but is expected to have some of the product for sale. A recently reported expansion programme is expected to boost Shawinigan Chemicals' capacity to over 600 million pounds per year by 1968. Part of the additional capacity apparently is intended for new uses, captive to the company.

(1) Chemical Week, May 23, 1963, p. 67

(2) Transcript, Vol. 40, p. 6005

(3) Canadian Chemical Processing, July, 1965, p. 70

(4) Transcript, Vol. 40, p. 5970

One reason for the limited volume of commercial sales is that ethylene is not readily shipped except by pipeline, although Imperial Oil Limited does use specially designed tank trucks to make shipments some distance from Sarnia.

It is estimated that just under one half of the total consumption of ethylene is for the production of the polyethylene resins which are dealt with in the section of the report on B.T.N. heading 39.02. The very rapid growth in the use of polyethylene has contributed substantially to the increase in production of ethylene. Another important outlet for ethylene is by way of ethylene oxide which, through a variety of intermediate compounds, emerges finally as antifreeze, synthetic fibres, plastics, surface coatings and explosives. Through styrene and acetaldehyde, ethylene enters into other important synthetic resins. The plant of Shawinigan Chemicals at Varennes, Quebec, was designed to convert ethylene to acetaldehyde as at least a partial replacement for acetylene in the company's production of vinyl resins. More generally, however, the trend toward substitution of ethylene for acetylene might be arrested because of the development of lower-cost acetylene from natural gas. Ethylene also has an important use in gasoline anti-knock compounds, and is reported to have increasing significance in the production of chlorinated solvents used in dry-cleaning.

Ethylene is not imported into Canada in large quantities.⁽¹⁾ With respect to exports, Imperial Oil Limited said of its exports of the product to Buffalo, New York, "while the volume is not significant in relation to total United States demand for ethylene, it represents an important market to Imperial Oil by increasing the scale of operations beyond the domestic demand".⁽²⁾

Canadian ethylene prices have not been published but at the time of the hearing, were said to be 5, 6, or 7 cents per pound.⁽³⁾ In the United States, the published price was generally steady at about $5\frac{1}{4}$ cents per pound since 1962, but declined to 4 cents in 1965. The fact that the price of ethylene has been lower than that of acetylene is said to have contributed to its success in supplanting that chemical. It is understood that there has been some weakening in price in the U.S.A., and lower prices are likely to be offered on very long contracts. Quotations as low as three cents a pound were suggested, and a price of four cents a pound published.⁽⁴⁾

Tariff Considerations

If for no specified end use, ethylene would normally be dutiable in the Canadian Tariff under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. If shipped in a container as a liquified petroleum gas it could be entered under tariff item 275 at rates of 10 p.c., B.P., $12\frac{1}{2}$ p.c., M.F.N. This item is not in Reference 120.

(1) Transcript, Vol. 40, p. 5972, 5992, 6002

(2) Same, Vol. 40, p. 5975

(3) Same, Vol. 40, p. 6001

(4) Oil, Faint and Drug Reporter, March 8, 1965, p. 17

Ethylene is admissible duty-free under item 851 if for the manufacture of synthetic rubber, and under item 921 if for the manufacture of synthetic resins. The duty-free provision of item 921 can apply only to products not ruled for Customs purposes to be made in Canada and, while ethylene is made in Canada, no such ruling has been made. Ethylene is specifically listed in item 476b which provides duty-free entry for certain types of apparatus and materials for the use of any public hospital, when these are deemed to be of a class or kind not made in Canada. Item 476b is also before the Board as part of another study, Reference 134, concerning materials and articles for use by hospitals and certain other institutions, groups and individuals.

Dow Chemical of Canada Limited and Imperial Oil Limited were the only companies making representations on ethylene. Dow Chemical recommended rates of 15 p.c., B.P., 20 p.c., M.F.N., while Imperial proposed free entry for it regardless of end use.

The Industry Committee proposed that "ethylene" be deleted from item 476b. This would permit all ethylene to be classified in one place, namely under an item like heading 29.01 of the B.T.N. The Committee pointed out that no evidence is available to show that it is being supplied to hospitals nor that there is ethylene of a class or kind not made in Canada.⁽¹⁾

Dow Chemical said that Canadian ethylene plants are not high-cost operations and "we can make ethylene just as cheaply in Sarnia in the plants that exist there today as it is likely produced in Michigan, let us say".⁽²⁾ The company, however, was disturbed at the possibility of a large plant being established in the U.S.A. near the Canadian border and shipping surplus production to Canada at a price that did not represent true cost plus normal profit. Its proposal concerning ethylene was part of a general submission by the company that these rates of duty should be applied uniformly to chemicals with as few exceptions as possible, because there is no reason to provide different rates of duty on products which are all part of a chemical complex. If uniform rates are applied the companies will determine which products can be produced.

Imperial Oil based its argument for free entry on the contention that basic hydrocarbons should be made available in large volume and at low cost for the chemical industry if that industry is to expand and compete effectively in the domestic and export markets. Ethylene, it was said, can be produced in Canada on a scale comparable to that in many plants in the United States and duty protection is unnecessary. The imposition of a tariff on imports of ethylene could only serve to encourage small scale and scattered production units, with consequent higher costs to the chemical industry of Canada. The Company also contended that a tariff would penalize chemical companies which might wish to use ethylene in areas of the country where, because of small volume, domestic production could not be justified. Imperial noted further that the cost of transporting large volume hydrocarbons conveys a form of protection to local producers. In addition the company pointed out that, because many of the products made from

(1) Transcript, Vol. 80, p. 12250

(2) Same, Vol. 40, p. 6006

ethylene are exported (and, therefore, any import of ethylene used for these products would qualify for drawback of duty), domestic producers must meet duty-free imports regardless of the duty rate in order to obtain the full Canadian market.

Any competition from imports of ethylene would most likely be felt by domestic producers for the merchant market. As noted earlier merchant consumption of ethylene in Canada appears to account for only some 20 per cent of the ethylene produced; the remainder is used captively. Merchant ethylene is made by Imperial Oil Limited at Sarnia, Ontario, and, to a lesser extent, by Shawinigan Chemicals Limited at Varennes, Quebec. The major users of merchant ethylene are apparently concentrated at Sarnia (Dow, Du Pont, Ethyl Corporation) and Montreal (Union Carbide).

In 1964, there were 33 ethylene-producing plants in the United States. Of these, 15 are in Texas; 3 in each of Louisiana, California and Michigan; 2 in each of Kentucky, West Virginia and Indiana; and 1 in each of New Jersey, Pennsylvania and Delaware.⁽¹⁾ No evidence was presented to show whether any of these plants are within economic range of transportation by pipeline, tank truck or rail tanker. Imperial Oil, however, while showing that transportation by specially designed tank truck is feasible, maintained that the cost of moving this large volume commodity is enough to preclude the need for import duties. Plants in Michigan would appear to have the best chance of exporting to Canada, and Dow Chemical of Canada pointed out the possibility of exports of incremental production from plants in Michigan. That company has two plants in Michigan, one at Bay City with a reported capacity of 70 million pounds per year and one at Midland with a reported capacity of 120 million pounds per year. The other plant in Michigan, with a reported capacity of 30 million pounds per year, is at Wyandotte and is operated by Wyandotte Chemicals. Ethylene has not been imported to Canada in commercial volume.

The Industry Committee's proposal for classification of ethylene would provide for the product when 90 per cent or more pure in an item worded like heading 29.01 of the B.T.N. Imperial Oil, the only substantial supplier of ethylene for the commercial market in Canada, considered that the ethylene of its manufacture would be of the required purity to be considered a chemical within the meaning of B.T.N. heading 29.01.

Propylene

The Product and the Process of Manufacture

Propylene (propene) is a colourless, flammable gas at normal temperature and pressure. It is one of the olefinic hydrocarbons produced from petroleum refinery gases in the process of making cracked gasoline blending stock. The naphthas and gas oils obtained when crude oil is distilled are cracked to yield additional high octane gasoline and, in the process, refinery gases are given off. These are collected and separated by low temperature

(1) Chemical Week, May 23, 1964, p. 69

fractionation. Propylene is produced in large quantity by normal refinery cracking operations for the production of gasoline. It is a product, too, of the later cracking process for ethylene; propylene so produced can be withdrawn or recycled to extinction in the production of additional ethylene.

The spokesman for Imperial Oil Limited said that propylene was not generally sold in high purity form. As with the other olefinic hydrocarbons which came before the Board, a purity of 90 per cent or more by weight was proposed for the propylene to be classified as a chemical under an item worded like heading 29.01 of the B.T.N. While stating that Imperial Oil's presentation is concerned with the high purity product in anticipation of its future use, he noted that current consumption is "virtually all of low purity which probably will be outside the scope of this hearing".⁽¹⁾

Current data on the capacity of Canadian plants to manufacture propylene are not available. Although propylene is probably produced in large volume in every petroleum refinery in Canada with cracking facilities (and these exist in every province except Prince Edward Island) it is not likely to be separated in most as a distinct product, but adequate potential capacity exists for Canadian requirements. There appear to be four companies who do separate it:⁽²⁾

- | | |
|-----------------------------------|-------------------|
| 1. Chemcell (1963) Limited | Edmonton, Alberta |
| 2. Dow Chemical of Canada Limited | Sarnia, Ontario |
| 3. Imperial Oil Limited | Sarnia, Ontario |
| 4. Shawinigan Chemicals Limited | Varennnes, Quebec |

Imperial Oil's propylene purification unit is said to have an annual capacity of 125 million pounds per year.⁽³⁾ In its presentation to the Board, the company said that most propylene is consumed by manufacturers in their own plants; however, for Imperial Oil, only a small proportion of production is used captively, in making detergent alkylate, and most of the company's output is for merchant sale.

The current market in Canada appears to be predominantly, if not entirely, for lower grades of propylene, although a market for material of higher purity is expected to develop in the near future when plans to manufacture polypropylene mature. This could provide an outlet for the propylene of 93 per cent purity which Imperial Oil said it can supply.

In the U.S.A., and presumably in Canada, most propylene apparently is simply used in the production of gasoline. Exclusive of this use, about 70 million pounds of propylene were consumed in Canada in 1961, compared with only 25 million in 1955.⁽⁴⁾ The 1961 consumption would have a commercial value in the order of four million dollars. This was low-purity propylene used for making chemicals. "Currently its main chemical uses, in low purity form, are for the manufacture of isopropyl alcohol (Brussels 29.04) propylene trimer and propylene tetramer (both Brussels 38.19) and cumene (Brussels 29.01)..."⁽⁵⁾

(1) Transcript, Vol. 40, p. 5988

(2) Canadian Petroleum Association, Statistical Year Book, 1963, p. 67f

(3) Same, p. 69

(4) Transcript, Vol. 40, p. 5969

(5) Same, Vol. 40, p. 5971

Reported consumption of propylene, exclusive of that used in gasoline, rose to about 75 million pounds in 1962 and 82 million pounds in 1963, and can be expected to grow significantly when polypropylene is made in Canada.

In the United States, the biggest single use of propylene is reported to be isopropyl alcohol, and this use is expected to grow steadily. On the other hand, its use for propylene tetramer is expected to decline dramatically if a shift takes place to biodegradable detergents; those based on the propylene tetramer are not biodegradable.

The best growth prospects are said to lie with the manufacture of polypropylene and cumene. Cumene is now made in Canada from benzene and propylene; polypropylene is not yet being produced here, but the spokesman for Dow Chemical of Canada Limited indicated that production in Canada could be expected.

Polymer Corporation Limited, at Sarnia, Ontario, is said to have a pilot plant in operation for producing ethylene-propylene-terpolymer (EPT) by a Canadian-developed process.⁽¹⁾ EPT is a synthetic rubber used for weather stripping in cars and in wire and cable applications; its use for industrial rubber products is developing because of its high resistance to heat, steam, oxygen, ozone weathering and to a wide range of chemicals.

As far as is known, imports of propylene have been insignificant and exports, non-existent.

Tariff Considerations

If imported, propylene could be entered as a liquified petroleum gas under item 275, at rates of 10 p.c., B.P. and 12½ p.c., M.F.N. It is probable that any propylene imported under this item would not be separated from propane or butane, and would be sold as propane or butane rather than as propylene. This tariff item is not within Reference 120. Propylene could be entered duty-free under item 921, for the manufacture of synthetic resins and possibly, under item 851, for the manufacture of synthetic rubber.

Imperial Oil Limited was the only company to make a presentation to the Board on propylene. This company pointed out at the public hearing in May, 1961 that the controlling rate of duty on high purity propylene is Free for both British Preferential and Most-Favoured-Nation Tariffs under tariff item 921, and recommended that free entry should continue regardless of end use.⁽²⁾ The arguments supporting the recommendation on propylene were the same as those for ethylene. In commencing its presentation, Imperial Oil stated: "The products ethylene, propylene, butylenes [and butadiene] have been grouped together to avoid repetition since the factors involved with regard to duty rates are identical on all four".⁽³⁾ These factors are discussed in this report under ethylene.

(1) Chemistry in Canada, March, 1964, p. 20

(2) Transcript, Vol. 40, p. 5973

(3) Same, Vol. 40, p. 5965

As has been noted, although there is a high-purity propylene, most of the use is of a low-purity product. This likely would fall outside the industry's proposed classification of a chemical grade of 90 per cent purity by weight, and be outside the terms of this study because of the applicability of item 275 of the Customs Tariff.

III OTHER PRODUCTS OF HEADING 29.01

As noted in the introduction to this heading, the products can be conveniently considered in five groups. Benzene, toluene and xylene are the principal products of one of these groups, and acetylene, butadiene, butylene, ethylene and propylene, dealt with in the previous sub-section, are the principal products of another. In the remaining three groups, there are only a few products of commercial importance in Canada; of these, cyclohexane has the greatest commercial importance.

Cyclohexane

Cyclohexane (C_6H_{12}), a cyclic aliphatic hydrocarbon, is a colourless, toxic, highly flammable liquid with the odour of chloroform. It boils at $81^{\circ}C$, is insoluble in water but miscible with alcohol or ether.

The product may be obtained directly from petroleum by fractionating higher natural-gasoline cuts, and other gasoline cuts may be hydroformed to yield a mixture of cyclohexane and methylcyclopentane. It can also be produced from benzene. An economic advantage was said to result if the benzene is derived from petroleum rather than coal-tar because by-product hydrogen can be reacted with the benzene to produce cyclohexane.

Cyclohexane is made in Canada only by the British American Oil Company, Limited, at its Montreal East refinery. The first deliveries from the plant apparently were made at the end of 1961 to the sole Canadian consumer, Du Pont of Canada Limited, at Maitland, Ontario. Prior to its manufacture in Canada cyclohexane was imported by Du Pont from Texas, U.S.A. Capacity to produce cyclohexane in Canada in 1965 was estimated to be 18 million gallons per year, compared with 285 million gallons per year in the U.S.A.⁽¹⁾ There are indications that capacity in both countries has undergone considerable expansion in recent years.

Du Pont uses cyclohexane as a raw material in the manufacture of adipic acid, an intermediate chemical for the production of nylon 6/6. Small quantities are also used, indirectly, as a solvent and in the production of plasticizers.

Cyclohexane was said to account for more than one half of the cost of raw materials used in the production of nylon resins, and to be a significant item in the cost of the end-product fibre.

⁽¹⁾ Oil, Paint and Drug Reporter, February 8, 1965, p. 34

In the United States, currently, its largest use is for the same purpose, but the most dynamic growth prospects for cyclohexane appear to stem from its use in making caprolactam, from which nylon 6 is made, a nylon closely resembling and competitive with, the nylon 6/6 which up to this time has dominated the Canadian market.

Although Union Carbide has announced plans to make nylon 6 in Canada, it will import its caprolactam, at least for the time being, and hence will not immediately increase the demand for cyclohexane in Canada. Similarly, Courtaulds Canada Synthetic Fibres Limited has announced plans to spin nylon 6 fibre from imported nylon polymer and so will not immediately increase the demand for Canadian cyclohexane. Canadian Industries Limited will produce nylon 6/6 from purchased polymer, at least some of which is understood to be available from Du Pont of Canada Limited.

Before B.A. Oil started to produce cyclohexane, Du Pont of Canada imported it from the United States under long term contracts. Exports of cyclohexane from the U.S.A. to Canada in 1960 and 1961 were reported to be some 12 million gallons per year,⁽¹⁾ which would have a value, at list prices at that time, in excess of three million dollars per year. With commencement of production of cyclohexane in Canada, imports appear to have ceased, although caprolactam and nylon polymer will be imported. There are no known exports of cyclohexane from Canada.

As a part of the long term contract with suppliers, Du Pont was able to purchase cyclohexane at prices lower than the quoted price. It was suggested that the company expected to continue to be able to buy at favourable prices. The published U.S. price early in 1965 was 25 cents per U.S. gallon, bulk, contract price, at works.⁽²⁾

Tariff Considerations

Du Pont of Canada reported that its imports of cyclohexane were entered duty-free under item 921, as a material not made in Canada, for use in the manufacture of synthetic resins. Cyclohexane might otherwise be entered under item 208t, duty-free under the B.P. Tariff, and at 15 p.c., M.F.N., or as a product of petroleum under item 269(i) at $\frac{3}{4}$ cent per gallon, B.P. and one cent per gallon, M.F.N.

Both the producing company, The British American Oil Company, Limited, and the consuming company, Du Pont of Canada Limited, proposed that cyclohexane be entered into Canada free of duty until made in Canada, after which the rates of duty should be 15 p.c., B.P. and 20 p.c., M.F.N. Although the product is now made in Canada it has not been so ruled for purposes of the Customs Tariff.

B.A. Oil referred to the excess production capacity in the U.S.A. and the potential of imports from that country's larger production units. Canadian facilities, it was said, are smaller than those in the United States and have a lower margin of profit which

(1) Oil, Paint and Drug Reporter, June 19, 1961

(2) Same, March 8, 1965, p. 15

"could easily be wiped out if U.S. suppliers were allowed to ship in duty-free product".(1)

A spokesman for Du Pont stated that "it is a principle of my company that we think tariffs should be adequate to give the producer a very large share--if not the entire share--of the Canadian market, and we are quite happy to subscribe to this principle when we are a purchaser".(2) Such a principle was believed to help the producer to achieve economies of scale which would be in the national interest and of benefit to consumers. Thus rates of 15 p.c., B.P., 20 p.c., M.F.N. on cyclohexane would be acceptable to Du Pont; it might be noted that Du Pont proposed rates of 25 p.c., B.P., 30 p.c., M.F.N. for the nylon polymer for which cyclohexane is a raw material.

With respect to classification of cyclohexane under an item worded like B.T.N. heading 29.01, the spokesman for Du Pont observed that cyclohexane constituted from one to three per cent of the refinery petroleum stream, but was of a purity of 85 to 90 per cent in the refined product, and that "we believe that in every use it has ever been put to it is properly called a chemical".(3) The company spokesman stated that the cyclohexane used by Du Pont of Canada was of a purity of 98 per cent.(4)

By the criteria suggested subsequently by the Industry Committee for cycloparaffins, which would include cyclohexane, a product would be classified under the proposed item, like B.T.N. heading 29.01, if of a purity of 50 per cent or more by weight. Thus, all the commercial cyclohexane referred to by Du Pont would be classified under that item. However, if the criterion of purity for this group of hydrocarbons were to be made 90 per cent or more by weight, as suggested by Imperial Oil, and as proposed by the Committee for certain other hydrocarbons, some of the commercial forms of cyclohexane might be excluded. As noted above, however, the cyclohexane which constituted almost the entire Canadian consumption at the time of the hearing was said to be of a purity of 98 per cent, well above the minimum even if this were 90 per cent by weight.

Other Chemicals

A number of other chemicals of B.T.N. heading 29.01 were brought to the attention of the Board. These are used in making pharmaceuticals, rubber, resins and plastics, paints, insecticides, perfumes, aerosol propellants, in processing vegetable oil seeds, and in producing other chemicals.

Butanes and propanes are chemicals of heading 29.01 of the B.T.N. dutiable in the Canadian Customs Tariff under item 275(b) which is not part of Reference 120. The Canadian Manufacturers of Chemical Specialties Association requested free entry for these

(1) Transcript, Vol. 39, p. 5784

(2) Same, Vol. 39, p. 5772

(3) Same, Vol. 38, p. 5763

(4) Same, Vol. 38, p. 5760

products.(1). The Association's interest was in the use of butane and propane as aerosol propellants. Although the products are made in Canada, the Canadian materials were said to be unsuited for this use because of the addition of mercaptan, to provide them with a detectable odour as a safety precaution.

Hexane, another saturated acyclic hydrocarbon, came before the Board in a joint submission by the following companies:

Canadian Vegetable Oil Processing Limited, Hamilton, Ont.
Co-Op Vegetable Oils Limited, Altona, Man.
Saskatchewan Wheat Pool, Vegetable Oil Division, Saskatoon, Sask.
Toronto Elevators, Division of Maple Leaf Mills Company Limited,
Toronto, Ontario
Victory Soya Mills Limited, Toronto, Ontario
Western Canadian Seed Processors, Lethbridge, Alberta

The companies reported that they use commercial hexane, as a selective solvent, for extracting vegetable oil from seeds and that, in this use, there is no economic substitute. Hexane is not made in Canada. The six companies making the submission indicated that their requirements were for about 500,000 to 600,000 Imperial gallons per year, and that this would constitute about two thirds of the hexane used in Canada, suggesting a total import requirement of between 750,000 to 900,000 Imperial gallons a year. The U.S. refinery selling price was given as 15 to 18 cents per U.S. gallon which was said to work out at about 30 cents per Imperial gallon delivered in Canada. The laid-down cost of Canadian annual requirements would thus be in the order of \$225,000 to \$300,000.

Commercial hexane was said to consist of about 88 per cent normal hexane, with the remainder being undesirable impurities. Under the existing Tariff hexane is entered as a product of petroleum under item 269(i), at rates per gallon of $\frac{3}{4}$ cent, B.P., one cent, M.F.N. The companies proposed continuation of these rates of duty until the product is made in Canada, at which time they would have no objection to continuation of the existing rates of duty or "to the imposition of whatever reasonable duty rates the Canadian producer might justify".(2)

The indicated purity of 88 per cent would leave the product outside the Industry Committee's proposed criterion of 95 per cent or more by weight for paraffinic hydrocarbons. If the Committee's criterion were adopted, commercial hexane would remain classified under tariff item 269(i).

Cyclopropane, another cyclane of the same group as cyclohexane, was mentioned before the Board by E.R. Squibb and Sons of Canada Limited.(3) The company began to manufacture the product in 1955 for anaesthetic uses. Cyclopropane for anaesthetic purposes is ruled made in Canada and is dutiable under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. More generally, it is dutiable under item 208t at rates of Free, B.P., 15 p.c., M.F.N. The company

(1) Transcript, Vol. 38, p. 5702

(2) Same, Vol. 40, p. 6019

(3) Same, Vol. 39, p. 5870

requested rates of 15 p.c., B.P., 20 p.c., M.F.N., stating that any reduction could lead to the shutting down of the company's plant in Montreal. Imports were reported to be \$120,000 in 1962.⁽¹⁾

Interest was expressed by Hercules Powder Company (Canada) Limited in three of the cycloterpenes, namely camphene, dipentene and pinene. These products are extracted from vegetable sources, in particular pine trees. Dipentene was said to be not used in Canada, but the company reported that it imported "substantial quantities" of the others. The company expressed the view that these would be unlikely to be made in Canada because the species of pine in Canada were not rich in these cycloterpenes. Pinene is used as a chemical intermediate in the manufacture of lubricating oil additives. Camphene is useful as a raw material for synthetic camphor, isobornyl acetate (for perfumery and similar uses) and for insecticides. Dipentene is potentially useful in lubricating oil additives and other chemical synthesis.

Dipentene and pinene are now entered duty-free under tariff item 261, under the broad classification "turpentine". Dipentene may also be entered duty-free under tariff item 921, when for use in the manufacture of synthetic resins and both dipentene and pinene may be entered at rates of Free, B.P., 5 p.c., M.F.N., under tariff item 220e, when used as materials for the manufacture of additives for heating and lubricating oils. Camphene is dutiable at rates of Free, B.P., 15 p.c., M.F.N., under tariff item 208t, but may be entered duty-free under item 791 if used as a material for the manufacture of pesticides.

Three other hydrocarbons of heading 29.01 were the subject of representations. These were alpha methyl styrene, divinyl benzene and vinyl toluene.

Alpha methyl styrene was the subject of a statement by B.A. Shawinigan Limited. The company, at the time of the hearing in 1961, reported production of about two million pounds per year as a by-product in the production of phenol from cumene. Because the Canadian market for the product is extremely small, the bulk of production is hydrogenated back to cumene. Its use was said to be as a "chain-stopper" in alkyd resins, in which use it controls the length of the molecular chain of the resin. Alpha methyl styrene is dutiable under item 711 at rates of 15 p.c., B.P., 20 p.c., M.F.N., and the company requested continuation of these rates.

Divinyl benzene was mentioned by Polymer Corporation Limited as a product of interest to the company, and which now enters Canada duty-free under item 851 when for use in the manufacture of synthetic rubber. The company proposed continuation of duty-free entry. The product is understood to be not made in Canada, and published information suggests that imports are less than \$50,000 per year.

Vinyl toluene was the subject of a statement by the Canadian Paint Varnish and Lacquer Association which requested free entry of the product while it is not made in Canada. Vinyl toluene may be entered duty-free under item 921 as a material of a kind not made in Canada for use in the manufacture of synthetic resins. The product was said to be an essential and non-substitutable raw material in the manufacture of styrenated alkyd resins. The proposal by the Canadian

(1) Dept. of Trade and Commerce, Chemical Import Trends, 1962 Supplement, p. 10

Paint Varnish and Lacquer Association was opposed by Dow Chemical of Canada Limited because it was said to be competitive with styrene in essentially all its end uses.⁽¹⁾ Dow Chemical requested rates of 15 p.c., B.P., 20 p.c., M.F.N. because of this competitive feature. The company took the view that chemicals generally should bear these rates of duty. Vinyl toluene is not made in Canada.

The Canadian Paint Varnish and Lacquer Association estimated the Canadian market for the product in 1960 at about 350,000 pounds, valued at approximately \$62,000. Imports in 1962 were reported at about \$150,000 which, at a published price of 14 cents a pound, would suggest the importation of about one million pounds.

As noted in the earlier part of this section, dodecyl benzene, tridecyl benzene and pentadecyl benzene were the subject of discussion by Imperial Oil Limited, Lever Brothers Limited, Colgate-Palmolive Limited and Procter and Gamble Company of Canada Limited with respect to the use of these products as detergent alkylates. Because the products of commerce are almost invariably mixtures, they are dealt with in the sections of the report on B.T.N. headings 38.19 and 34.02.

The Association of British Chemical Manufacturers, in a general submission on organic chemicals of Chapter 29 of the B.T.N., urged that:

"For all products not made in Canada in quantities substantial in relation to Canadian requirements ... no duty be charged on the U.K. products and that the maximum margin of preference be granted to the British manufacturer."⁽²⁾

The Toilet Goods Manufacturers Association submitted that end-use provisions in the tariff are necessary and justified for goods required by industry as raw materials, particularly when they are not made in Canada. Although tariff item 264(a) under which imports of the essential oils may be entered is not within the terms of Reference 120, there was said to be the possibility that the "n.o.p." provision of this item could result in certain chemicals being classified to B.T.N. Chapter 29 and excluded from tariff item 264(a) with the resulting loss of the present duty-free entry. The Association proposed that the Board make a recommendation to ensure the continued application of the end-use privilege. The chemicals of this heading to which this proposal applies are:

camphene
caryophyllene crude
cymene
dipentene
phellandrene
pinene
terpinolene

The Canadian Pharmaceutical Manufacturers Association submitted to the Board a list of chemicals used by its members in the manufacture of pharmaceutical products and recommended that some end-use treatment be adopted for these chemicals when so used. The Association recommended that rates of Free, B.P. and 15 p.c., M.F.N.

(1) Transcript, Vol. 41, p. 6167

(2) Same, Vol. 36, p. 5255

should apply when the products are not made in Canada and that the heading rates proposed by the Industry Committee (15 p.c., B.P., 20 p.c., M.F.N.) apply when the products are made in Canada. The chemicals in the present heading to which this proposal applies, with the more important marked with an asterisk, are:

benzene*
isobutylbenzene
n-heptane
toluene

The Industry Committee stated that, in its belief, all commercially significant products of heading 29.01 were dealt with in submissions received by the Board.⁽¹⁾ The Industry Committee proposed that rates of duty of 15 p.c., B.P., 20 p.c., M.F.N. should generally apply to all products classified by an item worded like B.T.N. heading 29.01 unless other rates had been justified before the Board.

(1) Transcript, Vol. 36, p. 5260

HALOGENATED DERIVATIVES OF HYDROCARBONS - B.T.N. 29.02INTRODUCTION

In the B.T.N. classification, the products of this heading result from the replacement of one or more of the hydrogen atoms in a hydrocarbon by a like number of halogens (fluorine, chlorine, bromine, iodine).

The value of shipments in Canada of products of this heading, in 1962, was about seven per cent of the total known value of shipments of all organic chemicals of B.T.N. Chapter 29. The principal products of the heading are dealt with in this section in the following order: vinyl chloride, fluorinated hydrocarbons and three important chlorinated hydrocarbons -- carbon tetrachloride, trichloroethylene and perchloroethylene.

In addition, a number of chemicals classified by heading 29.02 were the subject of representations before the Board. These are grouped in the later portion of this section.

The Industry Committee expressed the belief that all products of heading 29.02 which had commercial significance at the time of the hearing were dealt with in the submissions.

Vinyl Chloride

At room temperature and atmospheric pressure, vinyl chloride is a colourless, flammable gas with a faintly sweet odour. It is a colourless, mobile liquid below -13.9°C , and is sold, shipped and stored in the liquid state under pressure.

Two methods are employed commercially for its manufacture, the choice depending upon the raw materials available and the other products made or used in the other operations in the plant. Shawinigan Chemicals Limited reacts acetylene and hydrogen chloride to make vinyl chloride. When this firm began the production of ethylene at its Varennes plant in 1963, it was in a position to produce vinyl chloride by the ethylene route as well as from acetylene. Late in 1964 the company announced plans to triple its vinyl chloride capacity, using ethylene from its Varennes plant as the raw material. This process results in by-product hydrochloric acid which in turn can be reacted with acetylene and which could thus be complementary to Shawinigan's other process for making vinyl chloride. Dow Chemical of Canada, Limited at Sarnia, Ontario, also uses the ethylene-based process reacting chlorine gas with ethylene gas to form ethylene dichloride which is then purified and cracked to vinyl chloride. The above two companies are the only ones in Canada known to be making vinyl chloride monomer. Shawinigan Chemicals began production during World War II, and Dow Chemical in December, 1960.

The monomer was said to be a one-purpose product entirely for use in the manufacture of the polymer, polyvinyl chloride. Although Canadian demand for polyvinyl chloride has been increasing very rapidly,

the two producers of the monomer were reported to have sufficient capacity to meet Canadian requirements for the monomer and possibly to export some of it. Polyvinyl chloride is presented in the section of this report on heading 39.02.

Data on capacity are not readily available, but following the announced plans for tripling the capacity of the Shawinigan Chemicals' plant and for increasing the capacity of the Dow Chemical plant, total Canadian capacity could soon be in excess of 140 million pounds per year.

Shawinigan Chemicals has a large captive use for its vinyl chloride monomer in the production of various forms of polyvinyl chloride. Dow Chemical, on the other hand, is understood to sell all of its monomer, mainly to Monsanto Canada Limited and B.F. Goodrich Canada Limited and is reported to be going to sell also to Imperial Oil Limited for its production of polyvinyl chloride.

Canadian consumption of polyvinyl chloride type resins, at the time of the hearing in 1961, was estimated at about 50 million pounds annually, of which about 25 per cent was said to be supplied from imports.⁽¹⁾ In 1963, factory shipments of these resins in Canada were approximately 54 million and imports were 34 million pounds, valued at \$6.4 million. In 1964, shipments were recorded as 76 million pounds, an increase of nearly 50 per cent from 1963. These shipments of polyvinyl chloride in 1964 would have a commercial value of about \$12 million; at current published U.S. prices, the value of the monomer would be about six million dollars. Imports of polyvinyl chloride resins in 1964 were 42.8 million pounds valued at \$8.4 million which, together with the shipments data above, would suggest a total Canadian requirement for the monomer in the order of 120 million pounds. This amount, however, possibly includes some double-counting and perhaps Canadian consumption in 1964 was closer to 100 million pounds. The substantial imports in 1964 undoubtedly reflected the fact that the planned expansion in Canadian capacity was not yet in place and a substantial part of the imports in that year was necessary to supply the rapidly growing Canadian demand for polyvinyl chloride resins. Imports continued at about the same level in 1965. Imperial Oil Limited has reported its intention to make polyvinyl chloride at Sarnia, Ontario in substantial quantities and B.F. Goodrich is reported to have announced plans to double its plant capacity at Port Robinson, Ontario, suggesting further substantial growth in the market for vinyl chloride.

With respect to imports and exports, it was noted that the monomer can only be transported by pipeline or by pressure tank car or tank truck, thereby effectively limiting Canada's international trade to the U.S.A. International trade can more readily be carried on at the polymer stage than at the monomer. Dow Chemical noted that the monomer had been imported from the U.S.A. prior to the company beginning production in 1960, but that imports of the monomer had since been negligible. There are no known exports of vinyl chloride monomer. It was suggested at the hearing that over-capacity in the U.S.A., together with a duty said to be the equivalent of about 40 per cent, precluded the possibility of exports. It is possible, however, that some exports exist for polyvinyl chloride; the polymer is shipped in dry, flake or granular form.

⁽¹⁾ Transcript, Vol. 44, p. 6509

There are no Canadian published prices for vinyl chloride. The published price in the U.S.A. was eight cents a pound early in 1965 compared with a high of $12\frac{1}{2}$ cents a pound in 1960, a year in which a sharp break occurred in the price.

Tariff Considerations

Vinyl chloride was reported to be entered as an unenumerated article under item 711 at rates of 15 p.c., B.P., 20 p.c., M.F.N.

Representations were made by Dow Chemical of Canada Limited and by Shawinigan Chemicals Limited, both of whom recommended that vinyl chloride be accorded rates of duty of 15 p.c., B.P. and 20 p.c., M.F.N. In addition, B.F. Goodrich Canada Limited said:

"It is our belief that the basic raw materials, vinyl chloride (29.02) and vinyl acetate (29.14) monomers, which normally account for 60 per cent of selling price of resins, should not require tariff protection in excess of the finished product (polyvinyl chloride resins) for which they are primarily produced."(1)

The company, therefore, was not objecting to the rates proposed by the producers of the monomer provided the rates on the resins are at least at that level. Under heading 39.02, the company proposed rates of 15 p.c., B.P., 20 p.c., M.F.N. for the polymer, and noted the particular relevance of the M.F.N. rate if 20 p.c. were recommended by the Board for the monomer.

Shawinigan based its argument upon the desirability of protecting the Canadian manufacturers against crises in other countries, referring especially to over-capacity in the United States, and the consequent urge of producers in that country to export to Canada. The company's spokesman also pointed out that the loss of vinyl chloride business, either directly as the monomer or indirectly as the resin or as final products, would result in increased costs in other operations of the company. It was necessary, therefore, in the company's view, to have an overall rate to give consistent protection within the industry. Dow Chemical supported these rates as part of its general proposal for uniform rates for chemicals. No evidence was adduced to indicate why the particular rates of duty were proposed, especially why a rate of 15 p.c., B.P. was required. The rates, however, were those generally requested by chemical producers.

Fluorinated Hydrocarbons

These products are probably best known by the trade name "Freon". As a group, consumption of fluorinated hydrocarbons in Canada has a value of several million dollars; their use had been increasing rapidly over a number of years, but at the time of the hearing in 1961 was expected to display more moderate growth. In 1962, imports had been approximately 1.5 million pounds, valued at \$576,000; in 1963

(1) Transcript, Vol. 153, p. 22779

imports were valued at about \$600,000 and in 1964, according to U.S. export data, approximately 840,000 pounds were imported from the U.S.A., valued at nearly \$620,000. Imports, therefore, supply only a small part of total Canadian requirements.

The fluorinated hydrocarbons on which particular representations were made are cited below with their trade designations.⁽¹⁾

dichlorodifluoromethane	CFH-12
dichlorotetrafluoroethane	CFH-114
monochlorodifluoromethane	CFH-22
trichloromonofluoro methane	CFH-11
trichlorotrifluoroethane	CFH-113
monochlorotrifluoromethane	CFH-13
dichloromonofluoromethane	CFH-21

Du Pont of Canada Limited, the sole producer of the fluorinated hydrocarbons, at the time of the hearing in 1961, stated that the company either manufactured or would in the near future manufacture the first five of these chemicals at Maitland, Ontario; the remaining two are little used in Canada. Du Pont of Canada began manufacture of CFH-11 and -12 in late 1955, and added CFH-22 subsequently. In 1961, the company expected to commence production of CFH-113 and -114. These have since been ruled made in Canada for Customs purposes. In 1964, trade information indicated that Allied Chemical Canada Limited was constructing a plant at Amherstburg, Ontario for the manufacture of fluorinated hydrocarbons.

The five products which are made in Canada were said to account for greater than 98 per cent of the Canadian market for CFH products; some of the requirements of these five are imported. The principal use of these products is as a propellant for ejecting other products (such as insecticides, paints and odourants) from aerosol containers. There were said to be over 20 million such containers used in Canada in 1959. Another substantial use is as refrigerant gases. In these uses, they encounter competition from other refrigerants (for example, ammonia) and other gases for dispensing products (for example, butane) and other methods for dispensing products, such as squeeze bottles and air-pressure pumps. Minor uses include cleaning and degreasing agents for photographic film, electronic equipment, etc. A growing use was said to be as a blowing agent in the manufacture of polyurethane foams. Some exports of CFH products were reported, in particular to the West Indies.

While imports supply only a small portion of the market, they were said to have particular significance in pricing the product in Canada. In bulk quantities the Canadian price was said to be about the same as the price in the U.S.A. and, while the U.S. producer might enjoy some economies of scale, the Canadian producer did not regard himself at any serious competitive disadvantage in the Canadian market for the bulk product; he sought economies in ways other than scale. For the products packaged in cylinders, the Canadian price tends to be higher than that in the U.S.A. to cover higher handling costs for the smaller quantities dispersed more widely. It was stated at the hearing, however, that a company was importing the material in bulk, paying the 20 per cent duty and packaging the product into cylinders and selling it in cylinders at the U.S. price.⁽²⁾ This arrangement was said

(1) Transcript, Vol. 43, p. 6393

(2) Same, Vol. 43, p. 6404 and following

to keep the price of the Canadian material in cylinders at the level of prices in the U.S.A., even though this left a comparatively low margin to cover the cost of packing into cylinders in Canada.

As noted above, the price of CFH products in bulk (tank car or tank truck) is lower than the price in cylinders. Prices were said to range from 21 cents a pound for CFH-11 in bulk to 88 cents a pound for CFH-22 in 125 pound cylinders.⁽¹⁾ The typical differential between bulk and cylinder prices for the same grade of material was said to be about 16 cents a pound. This would indicate that CFH-11 in cylinders would be priced at about 37 cents a pound. Prices in western Canada are higher than east of Fort William, Ontario because of higher transportation and distribution cost. A spokesman for Du Pont of Canada noted, for example, that a given CFH product in cylinders which would be priced at 42 cents a pound up to Fort William would be 46 cents a pound west of Fort William, but that this differential did not fully cover the additional cost of delivery and return of the empty cylinders.

For the aerosol use, the product is typically purchased in bulk quantities, and it is also so purchased by some original equipment refrigeration manufacturers. For refrigeration service, the cylinders of CFH products are used. A somewhat lower price for the propellant use was said to have been necessary in order to make the products competitive in this use. A spokesman for Du Pont stated:

"In order to develop volume markets in the potentially large propellant field it has been necessary to price these products at a substantial reduction from the level charged in the refrigeration maintenance field, which buys in smaller quantities and requires a higher purity material."⁽²⁾

Tariff Considerations

When used as a propellant for pesticides, these CFH products are entered into Canada under tariff item 791, free of duty. For other uses they are entered under either tariff item 711 at 15 p.c., B.P. and 20 p.c., M.F.N., or 208t, Free, B.P. and 15 p.c., M.F.N. depending upon whether they are deemed to be made in Canada. Some mixtures would be dutiable under item 220a(i) at rates of 15 p.c., B.P., 20 p.c., M.F.N., though these might not be classified by heading 29.02. Most imports are believed to be for refrigerant use and dutiable at 20 p.c., M.F.N.

Du Pont of Canada recommended that the end-use item be deleted on the grounds that aerosols are not used for commercial agricultural purposes; the company urged that these products should be subject to duties of 15 p.c., B.P. and 20 p.c., M.F.N. As noted above, the company also referred to importations of bulk quantities of CFH products for packing in cylinders in Canada at a price that posed some difficulty for the Canadian manufacturer. These imports were said to

⁽¹⁾ Transcript, Vol. 43, p. 6397

⁽²⁾ Same, Vol. 43, p. 6405

be principally for refrigeration use and dutiable at present at 20 p.c., M.F.N. The company's proposal, therefore, would not directly affect these bulk importations, though it might permit some increase in price for insecticide aerosols.

The Canadian Manufacturers of Chemical Specialties Association submitted that:

"Freon used in insecticide aerosol products is presently duty free together with the component parts entering the package such as cans, valves, caps and insecticide concentrates.

"Freon is one of the most costly parts of the insecticide package and any increase in duty for Freon would sharply increase the price of the end product and would cause undue hardship from the price standpoint to the marketers ...

"The Association submits, therefore, that it would be unfair to place any duty on one of the components of the insecticide aerosol package product without also placing it on the other components and that until the finished insecticide products entering Canada are made dutiable, Freon entering insecticide aerosol products should remain duty free as at present."(1)

Polymer Corporation Limited included dichlorodifluoromethane in a list of chemicals of interest to the company under tariff item 851 where it may be entered free of duty when for use in making synthetic rubber; the company said that it is essential to continue free entry for such materials.

Carbon Tetrachloride
Perchloroethylene
Trichloroethylene

The above three products are here considered together because they were the subject of common expressions of interest. Together, they are products of considerable commercial importance. The Canadian market for each was said to be about 10 million pounds per year; in total, this would represent a commercial value of about four million dollars. Imports into Canada, in total, were valued at about \$750,000 in 1962 and at \$428,000 in 1963. Complete data are not available for exports, though a spokesman for Dow Chemical of Canada Limited indicated that, for the three chemicals in total, in the years 1956 to 1960 his company exported between five and ten million pounds per year, mostly to the U.S.A.

Statistics for imports into U.S.A. indicate exports from Canada in that order of magnitude.

(1) Transcript, Vol. 43, p. 6380-1

U.S. Imports from Canada

	<u>1961</u>		<u>1962</u>		<u>1963</u>		<u>1964</u>	
	'000 lb.	\$'000	'000 lb.	\$'000	'000 lb.	\$'000	'000 lb.	\$'000
Carbon								
tetra-								
chloride	3,367	276	2,344	240	-	-	-	-
Perchloro-								
ethylene	4,188	402	3,059	276	2,079	203	1,406	128
Trichloro-								
ethylene	<u>1,285</u>	<u>137</u>	<u>574</u>	<u>66</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
Total	8,840	815	5,977	582	2,079	203	1,406	128

Source: U.S. Bureau of Census, Imports of Merchandise for Consumption

The three products are the principal members of a group of chlorinated hydrocarbons, of which chloroform is also a member. The three are produced in the same plant, though not all at the same time, by Dow Chemical of Canada Limited at Sarnia, Ontario. The plant is designed to make the three products; chloroform and certain other products could also be made in the plant. Cornwall Chemicals Limited, at Cornwall, Ontario makes carbon tetrachloride, and Canadian Industries Limited, at Shawinigan, Quebec, produces perchloroethylene and trichloroethylene, and also chloroform. The plant of Dow Chemical began operation in 1951, that of Cornwall Chemicals in the mid-1950's. Capacity for all three products was said to be sufficient to supply all present and foreseeable demands.

About 75 per cent of the use of carbon tetrachloride was reported to be in the manufacture of the chlorofluoro hydrocarbons dealt with above. It has minor applications as a fire extinguisher fluid, as a solvent, as a grain fumigant and in several other small uses. The market is concentrated in Ontario; 95 per cent of total consumption was said to be in that province.

Carbon tetrachloride is sold in bulk in tank car or tank truck, and in steel drums. Users in all parts of Canada were said to be able to purchase Canadian carbon tetrachloride at a laid-down cost below that of the United States product. The reported price in the U.S.A. has been 10 $\frac{3}{4}$ cents per pound since 1958.

In excess of 90 per cent of the demand for perchloroethylene was reported to be for dry cleaning, and some 97 per cent of the trichloroethylene was reported to be used in degreasing metals. At the time of the hearing in 1961, imports of the two products from Western European countries were said to be rising at prices which posed difficulties for Canadian producers. Imports of perchloroethylene in 1962 and 1963 were about \$180,000 and \$60,000 respectively, a small portion of total Canadian requirements, but imports of trichloroethylene were approximately \$550,000 in that year, a much more substantial part of total Canadian consumption; in 1963, imports of trichloroethylene were \$350,000. On the other hand, as noted in the above table, significant amounts of the two products were exported from Canada.

The published price at the time of the hearing for both perchloroethylene and trichloroethylene in Eastern Canada was $13\frac{3}{4}$ cents per pound, carload or truckload lots (in drums) and somewhat higher west of the Lakehead. Perchloroethylene, in tank car or tank truck, was $12\frac{3}{4}$ cents per pound, and trichloroethylene was $11\frac{3}{4}$ cents per pound in those quantities.(1)

Tariff Considerations

The three products, carbon tetrachloride (other than analytical reagent grade), perchloroethylene, trichloroethylene (technical grade), are dutiable as unenumerated articles under item 711 at rates of 15 p.c., B.P., 20 p.c., M.F.N. Other grades, generally of small commercial importance in Canada, not ruled as a kind made in Canada, may be entered under item 208t, duty-free under the B.P. Tariff and at 15 p.c., M.F.N. Some quantities, particularly of carbon tetrachloride, might enter duty-free or at lower rates of duty under end-use items, for examples items 791 or 219a, though the evidence is that such imports are small. No imports from countries enjoying the British preferential rate have been recorded in recent years.

A joint submission by Dow Chemical of Canada and Cornwall Chemicals Limited proposed that rates of duty of 15 p.c., B.P., 20 p.c., M.F.N. apply to carbon tetrachloride of all grades. Similarly, Dow Chemical and Canadian Industries Limited proposed rates of 15 p.c., B.P., 20 p.c., M.F.N. for perchloroethylene and trichloroethylene in agreement with the rates of duty which the Industry Committee would accord to an item worded like heading 29.02 of the B.T.N.

No arguments were advanced by the companies in support of these rates specifically for these products. It was noted that they are the existing rates, and the companies in more general submissions urged that these rates of duty are appropriate generally for the chemical industry.

The Canadian Pulp and Paper Association expressed an interest in carbon tetrachloride which it said is widely used by its members in fire extinguishers. The Association said that it must strongly oppose any revision in the tariff which would result in an increase over current tariff rates, either now or in the future, in respect of chemicals used by the pulp and paper industry.

As noted below, carbon tetrachloride was included as one of the more important chemicals used by the Canadian Pharmaceutical Manufacturers Association.

Chloroform

Chloroform is another of the related group of chlorinated hydrocarbons. It can be produced in the same plant as the three products dealt with above. The only known producer in Canada is Canadian Industries Limited in the plant at Shawinigan, Quebec. The company's capacity was given as about 150 tons per year.

(1) Transcript, Vol. 42, p. 6250

Consumption of chloroform in Canada, at the time of the hearing in 1961 was estimated to be 300 to 400 tons a year, almost entirely in Ontario and Quebec. At the reported U.S. price of 17 cents a pound, this quantity would have a commercial value of just over \$100,000. With imports in 1961 of 467 tons, valued at \$110,000, the above estimate appears to substantially understate consumption, particularly when allowance is also made for production in Canada.

Imports in 1962 were 489 tons, also valued at about \$110,000. Imports in 1963 were only 34 tons valued at less than \$17,000; the average value of 25 cents per pound in 1963 would suggest that those imports consisted of grades or quantities of chloroform that did not figure largely in imports of earlier years when the average value was 12 cents a pound. In 1964, however, imports rose again to 860 tons, valued at \$170,000, an average price of approximately 10 cents per pound, more consistent with that of earlier years. This price undoubtedly reflects importations of grades and quantities for use in the manufacture of CFH products which account for well over 50 per cent of consumption. Smaller requirements are for pharmaceutical products and as an anaesthetic particularly for veterinary purposes. Most imports have been from the U.S.A.

Chloroform is named in item 219d, duty-free under 219d(1) when for anaesthetic purposes and dutiable at rates of Free, B.P., 20 p.c., M.F.N., under item 219d(2) when for other uses. Most imports have been dutiable at the 20 p.c., M.F.N. rate.

Canadian Industries Limited proposed rates of 15 p.c., B.P., 20 p.c., M.F.N. regardless of use. The proposed rates were submitted in the interests of uniformity of rates on chemicals generally, and because the company considered that the small quantity used for anaesthetic purposes (not more than six tons a year) "seems hardly sufficient to justify a special end-use provision."⁽¹⁾

The proposed rates were supported by Dow Chemical of Canada Limited because the company was reported to have a potential future interest in the manufacture of chloroform along with methyl chloride and methylene chloride.

As noted below, the Canadian Pharmaceutical Manufacturers Association included chloroform as one of the more important chemicals used by its members.

Other Products of Heading 29.02

A number of other products came before the Board under this heading, most of which have fairly specialized uses and consequently received expressions of interest from only one or two companies.

Four chlorinated hydrocarbons which are made in Canada were the subjects of separate submissions by Dow Chemical of Canada Limited. These are dealt with first below.

(1) Transcript, Vol. 42, p. 6236

Ethylene dichloride was made only by Dow Chemical, at Sarnia, Ontario, at the time of the hearing in 1961, though Shawinigan Chemicals Limited has recently been reported as a probable producer for its own use. Total use at the time of the hearing was said to be about 50 million pounds, almost all captive to Dow's production of vinyl chloride monomer. This production would have a commercial value in the order of five million dollars. The product has some use also in the manufacture of tetraethyl lead and as a solvent for greases, fats and oils. Imports were reported to be about 20 tons per year, negligible as a source of supply. There are no known exports. Although the Canadian price was said to be higher than the U.S. price, it was reported to be consistently lower than the laid-down cost of the U.S. material in Canada. The published U.S. price in March, 1964 was nine cents a pound, tank cars delivered, and the same price prevailed in August, 1965.

Ethylene dichloride is dutiable as an unenumerated article under tariff item 711 at rates of 15 p.c., B.P., 20 p.c., M.F.N.; it may be entered duty-free under tariff item 219a(ii) if for use as a pesticide.

Dow Chemical proposed that the rates of item 711 should continue. Ethyl Corporation of Canada Limited, the manufacturer of tetraethyl lead, supported the rates proposed by Dow Chemical.

Methyl chloride is produced in conjunction with methylene chloride by Dow Chemical of Canada Limited at Sarnia, Ontario. Imports amounted to \$120,000 in 1961, \$85,000 in 1962 and \$100,000 in 1963. In 1964, quantity data became available; in that year, imports amounted to 1.4 million pounds, valued at \$143,000, approximately 10 cents a pound on average. Some 95 per cent of consumption goes to making butyl rubber by Polymer Corporation; the latter was said to import part of its needs from the U.S.A. to maintain a second source of supply. Minor uses include refrigerants, anaesthetic and chemical intermediates.

At the time of the hearing, in 1961, the published price in the U.S.A. was $12\frac{3}{4}$ cents a pound, but Dow Chemical noted that methyl chloride was available in the U.S.A. at prices well below that level and that the Canadian price was exactly the same as the lower U.S. price.⁽¹⁾ The published U.S. price in 1964 was 10 cents a pound for the industrial grade; a price of $48\frac{3}{4}$ cents a pound was published for a refrigerator manufacturers' grade, delivered in cylinders.⁽²⁾

Most imports of methyl chloride would be entered free of duty under item 851 as a material for use in the manufacture of synthetic rubber. The product would otherwise be dutiable under item 711 at rates of 15 p.c., B.P., 20 p.c., M.F.N. Dow Chemical of Canada proposed 15 p.c., B.P., 20 p.c., M.F.N. for all uses, in the belief that these rates would deter imports. Polymer Corporation urged the continuation of the provisions of item 851, which would continue to provide duty-free entry for the major use.

(1) Transcript, Vol. 43, p. 6464

(2) Oil, Paint and Drug Reporter

Methylene chloride is made in substantial volume by Dow Chemical of Canada Limited at Sarnia, Ontario, production having begun late in 1958. Dow Chemical, in 1961, was importing the raw material, a chlorinated hydrocarbon mix, though it expected to produce the raw material in Canada. Hydrochloric acid is a saleable by-product along with co-product methyl chloride. Imports which had been valued at approximately \$250,000 before Dow Chemical began production in Canada, were reported to be \$90,000 in 1961, \$60,000 in 1962 and \$80,000 in 1963, not a very substantial amount compared with Canadian production. The imports are believed to have been primarily from Europe; exports were reported to be nil.

Methylene chloride is used principally for non-flammable paint remover; it is also used as a solvent in the manufacture of certain types of textile fibres, and for grease and wax; it is also a vapour pressure depressant in aerosol containers where it is substitutable for monofluorotrichloromethane (CFH-11). About 65 per cent of the use was reported to be in Ontario and Quebec, with the remainder in Western Canada.

For paint removal uses, methylene chloride was said to be supplied in drums at 13 to 13½ cents a pound; offerings were said to be made at less than 11 cents a pound, though this price was regarded as a dumping price. More generally, Dow Chemical reported that its more prevalent prices were 11 cents a pound in tank cars and 12 cents a pound in drums. Most of the company's sales were reported to be at prices lower than the comparable U.S. prices. The lower prices of imports from Europe were said to be important in the company's pricing policy. Three grades were reported to be sold in Canada, though differences in quality were not particularly great. The grades are aerosol, commercial and technical, all 98 or 99 per cent pure. Some European material was said to be of a purity of 70 to 75 per cent.

Methylene chloride may be imported duty-free under item 791 when used as a material for packing insecticides in aerosol containers. For other uses it normally is dutiable under item 711 at 15 p.c., B.P., 20 p.c., M.F.N. Dow Chemical estimated that the use for insecticide aerosols was perhaps one-quarter of the total market. The company proposed rates of 15 p.c., B.P., 20 p.c., M.F.N. for methylene chloride for all uses, in line with the general submission by the company for these rates of duty.

Ethyl chloride was the subject of a submission by Dow Chemical of Canada Limited. The company pointed out that by far the largest use of ethyl chloride is as a raw material in the manufacture of tetraethyl lead. Dow Chemical had produced ethyl chloride to supply this use until the sole producer of tetraethyl lead in Canada, the Ethyl Corporation, began to make ethyl chloride for its own use in 1960.

The spokesman for Dow Chemical noted that the company's plant had been too small to be really economical. It could not supply all of Ethyl Corporation's requirements, but the possibility of increasing its size was lost when Ethyl Corporation decided to build its own plant.

Imports in 1957 had been just over 23 million pounds, valued at \$1.6 million, all from the U.S.A.; in 1960, imports were about 20 million pounds, valued at \$1.4 million, but in 1961, with the opening of the Ethyl Corporation plant, imports declined to 322,000 pounds, valued at \$36,500. The substantially lower imports which followed in 1962, 1963 and 1964 are consistent with the view expressed by Dow Chemical that, with the opening of the new plant, imports should be reduced to essentially zero.⁽¹⁾ In 1964, imports were 10,000 pounds, valued at \$10,000.

A recent trade announcement indicated that Du Pont of Canada was expected to become Canada's second producer of tetraethyl lead in its new plant at Maitland, Ontario, with a rated tetraethyl lead capacity of 25 million pounds a year.⁽²⁾

No exports of ethyl chloride are reported. The product has other uses in Canada as a catalyst promoter in the manufacture of ethyl benzene, and as a refrigerant and anaesthetic, but these uses were said to be negligible compared with its main use. Ethyl chloride had been used in styrene production, but Dow Chemical noted that in its production of styrene and in that of Polymer Corporation, the chemical has been replaced by anhydrous hydrogen chloride.

Ethyl Corporation stated that it could sell ethyl chloride competitively at 10 cents a pound; the average value of imports, when large quantities were entering Canada, was about seven cents a pound. The current published U.S. price was given as 10 cents a pound in tank car quantities.

Prior to February 1, 1961 ethyl chloride could be entered duty-free under item 263d when for use in the manufacture of tetraethyl lead. Since that time it has not been admissible under that item. For this use, it would be dutiable under item 711 at rates of 15 p.c., B.P., 20 p.c., M.F.N. Ethyl chloride could be entered free of duty under item 219a, if for use as an insecticide, under item 791 if as a material for use in insecticide preparations, under item 219d(1), for anaesthetic purposes, or under item 851 if for use in the manufacture of synthetic rubber.

Dow Chemical of Canada Limited proposed rates of 15 p.c., B.P., 20 p.c., M.F.N. for ethyl chloride for all uses. The Ethyl Corporation of Canada Limited agreed with this proposal, stating that it had plenty of capacity to meet Canadian requirements. Neither company presented arguments in support of these rates specifically for ethyl chloride.

Polymer Corporation Limited listed ethyl chloride as a chemical of interest to it under tariff item 851, and said that it is essential to continue the duty-free entry of chemicals for use in the manufacture of synthetic rubber.

(1) Transcript, Vol. 42, p. 6308

(2) Chemistry in Canada, September, 1964, p. 16

Ethylene dibromide was the subject of a submission by Ethyl Corporation of Canada Limited who have an interest in the product for blending with tetraethyl lead in gasoline anti-knock compounds. Ethylene dibromide as a fumigant for soil and seed is understood to have been largely replaced by other bromine compounds, but it has some use as a lead scavenger in motor oils.

Ethylene dibromide is not made in Canada, and the Ethyl Corporation was reported to import over one million dollars worth of the product annually, which would account for 95 per cent of the imports and, hence, of Canadian consumption. The source of supply is the Ethyl-Dow Chemical Company, Texas, U.S.A. The Ethyl Corporation estimated that it might cost twice as much to make the product in Canada as to obtain it from its present source. The published U.S. price of ethylene dibromide in tank cars, freight equalized has remained at 28½ cents per pound since 1957.(1)

Ethylene dibromide may be entered duty-free under temporary item 263d for the manufacture of tetraethyl lead or compounds thereof. It may also be entered free of duty, as a material for pesticides, under tariff item 791 and while not made in Canada, under tariff item 921, for use in the manufacture of synthetic resins. Otherwise it is entered under tariff item 208t, Free, B.P. and 15 p.c., M.F.N. The Ethyl Corporation proposed that a permanent tariff item be passed to provide duty-free entry for ethylene dibromide for use in the manufacture of tetraethyl lead compounds.(2)

Dow Chemical of Canada took exception to a permanent provision for duty-free entry for ethylene dibromide, expressing interest in possible future production of the product in Canada. The company would not object to a duty-free provision to have effect as long as the product is not made in Canada. Given a proper source of bromine and a 20 per cent duty, Dow Chemical expressed the view that ethylene dibromide might be made in Canada.

The Ethyl Corporation observed that a rate of duty of 20 per cent might be generally satisfactory for products made in Canada, but not necessarily universally so. The company pointed out that it is producing tetraethyl lead compounds in Canada with free entry under the B.P. Tariff and a rate of 5 p.c., M.F.N., the rates of tariff item 220e.

As noted below, this chemical was included in a list in which the manufacturers of pesticides expressed an interest.

Paradichlorobenzene and orthodichlorobenzene were the subject of submissions by Record Chemical Company, Inc., the Canadian Manufacturers of Chemical Specialties Association and Imperial Chemical Industries Limited (I.C.I.), the last-named for paradichlorobenzene only.

Record Chemical began the manufacture of these products in 1961, using an imported crude mixture which is up-graded to the two products.

(1) Oil, Paint and Drug Reporter

(2) Transcript, Vol. 42, p. 6330, 6336, 6355

Consumption of paradichlorobenzene was estimated, at the hearing in 1961, to be five million pounds per year, which would have a commercial value in the order of \$600,000 at the published price of 12 cents per pound. The principal uses of the para- were said to be as an agricultural and household insecticide and as a deodourant (or re-odourant). Before its manufacture in Canada, requirements of the para- were imported, principally from the U.S.A., with the remainder from the U.K. and continental Europe. No estimate is available since that time of the portion of the market supplied by imports.

Orthodichlorobenzene is an inevitable by-product of paradichlorobenzene in fairly fixed ratios, in larger quantity than required by the Canadian market. No public information is available on the production or use of the ortho-, but Record Chemical noted that it would be able to supply all Canadian requirements and, in fact, would have to seek export outlets for the ortho-. The published U.S. price of orthodichlorobenzene also was about 12 cents per pound in tank car lots in 1964. The ortho- is used principally as a carbon removing agent, largely for carburetor cleaning. It is used as a raw material in dyes and other chemicals and as a wool cleaning agent in the textile industry.

Paradichlorobenzene may be entered duty-free under items 219a(2) or 791 if for insecticide use. If for such use in packages not exceeding three pounds gross weight, it could be entered under item 219a(1), Free, B.P., 12½ p.c., M.F.N. For other uses item 208t would have applied before the product was ruled made in Canada, and item 711, with rates of 15 p.c., B.P., 20 p.c., M.F.N. would apply thereafter.

For orthodichlorobenzene, the existing rates of duty are Free, B.P., 15 p.c., M.F.N. under item 208t; at time of writing, no made in Canada ruling has been issued for the product.

Record Chemical proposed rates of 15 p.c., B.P., 20 p.c., M.F.N. for the two products under an item like heading 29.02 of the B.T.N. These rates were considered by the company to be needed to protect its production from foreign competition, particularly from countries where wages are low.

The Canadian Manufacturers of Chemical Specialties Association proposed duty-free entry for the products until they become commercially available from Canadian production, at which time the Association would not object to the basket rates which may be established for the heading.(1) The Industry Committee proposed rates of 15 p.c., B.P., 20 p.c., M.F.N. for the heading.

Imperial Chemical Industries proposed free entry under the B.P. Tariff and 15 p.c., M.F.N. for paradichlorobenzene until the product was deemed to be made in Canada. Since the product is now ruled to be of a kind made in Canada, this proposal would become inoperative.

(1) Transcript, Vol. 43, p. 6380

Imperial Chemical Industries Limited also made representations on hexachloroethane, a chemical used for degassing aluminum, in some veterinary formulations and other minor uses. The company also presented a submission on halothane, a chemical represented as having unique anaesthetic properties. Neither of these products is made in Canada. I.C.I. stated that it supplied a major portion of Canada's requirements of hexachloroethane and all of the halothane used in Canada. The company proposed free entry under the B.P. Tariff and 15 p.c., M.F.N. for the products until they are ruled to be made in Canada. These are the existing rates which apply to these products under tariff item 208t.

Four other products not made in Canada were the subject of submissions by W.J. Bush (Canada) Limited. These were benzotrichloride, benzylidene chloride, beta-bromostyrene and benzyl chloride. The company stated that there was no significant use for these products in Canada at the time of the hearing in 1961, but that uses might develop in chemical manufacturing. These products are probably dutiable under item 208t, Free, B.P., 15 p.c., M.F.N., though some may have uses in perfumery, and be admissible under item 264a, Free, B.P., $7\frac{1}{2}$ p.c., M.F.N. This item is not in Reference 120. W.J. Bush proposed free entry under the B.P. Tariff and 15 p.c., M.F.N. until the products are made in Canada, at which time the company would have no objection to rates of 15 p.c., B.P., 20 p.c., M.F.N. A spokesman for the Industry Committee noted that the products are insignificant in Canadian commerce and asked the Board "to give consideration as to whether it should set up separate tariff items for every insignificant item merely because they may become important in the future ..." (1)

Trimethylene chlorobromide was the subject of a submission by E.R. Squibb and Sons of Canada Limited, reported to be the only importers of the material. The company uses it for the manufacture of a pharmaceutical product. Imports are believed, generally, to average less than \$50,000 a year. The product is at present dutiable under item 208t, Free, B.P., 15 p.c., M.F.N. The imports by the company are from the U.S.A. and subject to the duty of 15 p.c. The company noted that, in a three-year period, it had paid duty totalling approximately \$20,000, and requested free entry for trimethylene chlorobromide. A spokesman for the Industry Committee suggested that the free entry be qualified to apply only while the product is of a class not made in Canada.

The Toilet Goods Manufacturers Association submitted that end-use provisions in the Tariff are necessary and justified for goods required by industry as raw materials, particularly when they are not made in Canada. Tariff item 264(a), under which the essential oils of interest to members of the Association are imported, is not within the terms of Reference 120; certain chemicals classified to B.T.N. Chapter 29 might be excluded from entry under item 264(a) because of its "n.o.p." provision; an increase in rates of duty from the present rates of Free, B.P., $7\frac{1}{2}$ p.c., M.F.N. could result. The Association recommended that the effect of the n.o.p. provision be removed from item 264(a). The chemical in this heading in which the Association expressed an interest is bromostyrol, also known as bromostyrene, bromstyrol or bromostyrolene.

The Canadian Pharmaceutical Manufacturers Association submitted to the Board a list of chemicals used by its members in the manufacture of pharmaceutical products and recommended that some end-use treatment be adopted for these chemicals. The Association recommended that rates of Free, B.P. and 15 p.c., M.F.N. should apply when the chemicals are not made in Canada and that the rates proposed by the Industry Committee (15 p.c., B.P., 20 p.c., M.F.N.) apply when the products are made in Canada. The chemicals in the present heading to which this proposal applies with the more important chemicals marked by an asterisk, are:(1)

bromobenzene
m-bromochlorobenzene
bromoform
bromomethane
carbon tetrachloride*
carbon tetrafluoride
chlordan
chlorobenzene
alpha-chlorodiphenylmethane
chloroethane
chloroform*
p-dibromobenzene
1:2-dichloroethane
iodoform
tetrachloroethylene

At the hearing on pesticides in November 1962, a group of seven manufacturers of pesticides made a proposal concerning a list of biologically active materials for use in the manufacture of pesticide formulations. The companies were:

A.H. Howard Chemical Co. Ltd.	Orangeville, Ontario
Allied Chemical Services Ltd.	Calgary, Alberta
Chipman Chemicals Ltd.	Hamilton, Ontario
Gallowhur Chemicals Canada Ltd.	Lachine, Quebec
Manchester Products Ltd.	Galt, Ontario
Niagara Brand Chemicals	Burlington, Ontario
Green Cross Division	
Sherwin Williams Co. of Canada Ltd.	Montreal, Quebec

The companies proposed:

"The signatories of this brief share the view of the Chemical Industry Committee that, when a biologically active chemical now on Appendix II, is made in Canada, it should become subject to the duty rates which have been recommended for the appropriate B.T.N. heading."⁽²⁾

The companies proposed duty-free entry for the materials as long as they are not made in Canada. The proposal was based on the belief that a duty on biologically active materials, not made in Canada,

(1) Transcript, Vol. 87, p. 13293

(2) Same, Vol. 108, p. 16332-3

would increase the prices of pesticides to Canadian users without producing off-setting advantages for any segment of industry. The products under the present heading are:

Aldrin
 B.H.C. (Hexachlorocyclohexane)
 Chlordane
 Dichlorodiphenyl Dichloroethane
 D.D.T.
 Ethylene Dibromide
 Heptachlor
 Hexachlorobenzene
 Lindane
 Methyl Bromide

For methyl bromide (bromomethane), the Canadian Federation of Agriculture requested continued duty-free entry under tariff item 219e, when for use in combatting destructive insects and pests.

In addition to the products which were the subject of submissions under heading 29.02, a number of products that would be classified under this heading, if separate chemically defined compounds, are generally to be found in commerce as mixtures or preparations. Among the most important of these are some products put up as preparations having insecticidal or similar uses. These include aldrin, chlordane, D.D.T. (dichlorodiphenyl trichloroethane), D.D.D. and heptachlor. These products were included in representations made before the Board at the hearing of November 20, 1962 on heading 38.11 of the B.T.N., dealing with disinfectants, insecticides, fungicides, weed killers and similar preparations, and are dealt with in this report under that heading.

SULPHONATED, NITRATED OR NITROSATED DERIVATIVES
OF HYDROCARBONS - B.T.N. 29.03

The products classified by this heading are hydrocarbons in which one or more hydrogen atoms have been replaced by a like number of sulphonic groups, or nitro groups or nitroso groups, or some combination of these and by one or more halogens.

An important group of products, any member of which, if a separate chemically defined compound, would be classified under this heading, includes dodecyl benzene sulphonic acid, tridecyl benzene sulphonic acid, pentadecyl benzene sulphonic acid and related products. They are intermediates in the production of water-soluble metallic and other salts, such as sodium dodecyl benzene sulphonate. The salts achieve their substantial commercial importance as surface-active agents of heading 34.02. The dodecyl benzene and other sulphonic acids are not found in commerce in chemically pure form; the interest in related products more particularly concerns the alkyl aryl hydrocarbon mixtures of heading 38.19 and the sulphonated derivatives of these, which comprise the surface-active agents of heading 34.02. The problem of classification of these sulphonic compounds is similar to that noted under heading 29.01 for dodecyl benzene, and arose also for further compounds under subsequent headings.

A number of representations were made under heading 29.03 to explain the relationships between these products, to accommodate possible future commercial production of the separate chemically defined precursors classified under heading 29.03, and to permit a fuller discussion of all products of the heading. While this procedure had considerable merit in permitting an orderly presentation of views before the Board at the public hearings, it is not a particularly convenient way to deal with the very complex range of surface-active products in this report. The nature of the representations is outlined in the following paragraphs, but the commercial considerations affecting the surface-active and detergent industry are dealt with in this report under heading 34.02.

Nine companies made a joint submission on surface-active agents under heading 29.03:

Canadian Aniline and Extract Co. Ltd., Hamilton, Ont.
Chemical Developments of Canada Ltd., Montreal, Que.
Clough Chemical Co. Ltd., St. John's, Que.
Colgate-Palmolive Ltd., Toronto, Ont.
The Hart Products Co. of Canada Ltd., Guelph, Ont.
Lever Brothers Limited, Toronto, Ont.
Lignosol Chemicals Limited, Quebec, Que.
Scholler Brothers Limited, St. Catharines, Ont.
Surpass Petrochemicals Ltd., Toronto, Ont.

These companies proposed rates of 15 p.c., B.P., 20 p.c., M.F.N. for all surface-active agents, and recommended "the virtual elimination of all end-use items that affect surface-active agents."(1)

(1) Transcript, Vol. 44, p. 6660

The companies made a general proposal applicable to all surface-active agents not just to any that might be classified by heading 29.03. They noted that:

"Essentially all surface agents are a family of products made in Canada. The others that may be produced in foreign countries are chemically identical, or directly competitive.

"This level of rates is required in our opinion, taking cognizance of the economic factors in Canada, the competitive situation in other countries, the rate of new developments and the basic need for these materials ...

"We therefore believe that all surface active agents must be considered made in Canada, or directly competitive with products made here. In a field as complex as this, there may be some specific exceptions to our general contention. We intend to discuss any exceptions as they are scheduled in the 29 series of items, and feel that in an area as subject to change and new development as this one, very careful study should be given to requests for lower duties before they are granted."⁽¹⁾

Some of the surface-active chemicals are ruled to be made in Canada, and dutiable under tariff item 711 at rates of 15 p.c., B.P., 20 p.c., M.F.N.; others might still be entered under item 208t, Free, B.P., 15 p.c., M.F.N., or item 216 as acids, n.o.p., of a kind not produced in Canada at the same rates of duty. Certain end-use items that might apply would permit free entry of some of the products.

Separate submissions on surface-active agents were also made under heading 29.03 by Lever Brothers Limited, in conjunction with Hart Products Co. of Canada Ltd.; by Chemical Developments of Canada Ltd. (on dodecyl benzene sulphonates) and by Colgate-Palmolive Ltd. The companies outlined their own special interests in the range of products, and each company supported the proposed rates of 15 p.c., B.P., 20 p.c., M.F.N.

As noted in the submission of one of the companies:

"Separate briefs will be submitted as individual products are called for hearing by the Board. However, it is our submission that it is necessary to consider products of this industry collectively, for the reasons explained at some length in the general brief of the detergent industry on surface active agents."⁽²⁾

Trinitrotoluene
Dinitrotoluene

Two other products of heading 29.03 are important because of their use in prepared explosives. These are trinitrotoluene (TNT) and dinitrotoluol (DNT). These products were not the subject of submissions at the hearing on heading 29.03, but were part of the representations on explosives under Chapter 36 of the B.T.N. The following outline of interests in the two products is given against the background of the discussion of explosives in the section of the report dealing with Chapter 36.

(1) Transcript, Vol. 44, p. 6546-7

(2) Same, Vol. 45, p. 6678-9

The two products are made in Canada in the same plant and by same process at Beloeil, Quebec by Canadian Industries Limited, the sole producer. Both find their only use in Canada as explosives or in the production of explosives.

According to the submission made by Canadian Industries Limited,

"TNT is a very useful and versatile explosive, finding application as a pure substance, in combination with other explosives (PETN,RDX), and as the powder ingredient in formulations such as slurry explosives. It is relatively inexpensive and has low sensitivity to initiation by impact, friction, or elevated temperature. TNT is only mildly toxic and is one of the safest explosives to handle."(1)

The main commercial application of trinitrotoluol in Canada is as an ingredient in slurry type explosives, such as "Hydromex", containing about 25 per cent of this product. It is also used in mixtures with PETN (pentaerythritol tetranitrate) to produce a primer for the initiation of blasting agents.

Dinitrotoluol, as produced by C.I.L., is a waxy solid having a melting point of approximately 56°C. It is manufactured from the same raw material and in the same equipment as used for the production of trinitrotoluol. DNT occurs as an intermediate product during the production of TNT and is not isolated. However, if DNT is required, the conditions of process are modified and DNT is taken off. DNT is used in Canada in certain commercial explosives formulations, other than slurry explosives. Elsewhere, it is also used as an intermediate in the manufacture of certain types of plastic materials and dyestuffs. The grades required for these uses could be supplied from Canadian production if demand for them becomes established in Canada.

Although TNT had been produced in a batch process in Canada for many years, the plant at Beloeil was destroyed by fire in 1958 and was replaced by a new plant, completed in 1962. This new plant was described by a spokesman for C.I.L. in the following manner:

"the new plant ... utilizes a novel continuous process which is expected to be extremely efficient and safe; C.I.L.'s new plant represents the first commercial application of this process in the world."(2)

Although the building of the new plant was said to have been delayed by the availability in the U.S.A. for a number of years of war surplus TNT at very low prices, the plant was expected to be a very economical producer of TNT for the growing requirements of that product in blasting slurries, the use of which C.I.L. was actively developing. The plant was reported to have adequate capacity for foreseeable Canadian demand of TNT, with a margin available for export. The raw materials are available from Canadian sources, some being made by the company at Beloeil.

(1) Transcript, Vol. 107, p. 16161

(2) Same, Vol. 107, p. 16161

The plant gains added economic advantage through the availability of recoverable dilute sulphuric acid which C.I.L. is able to use in the manufacture of fertilizers at the same site.

Because there was no production of TNT or DNT in the period 1959 to 1962, the Canadian market is reflected in the imports of the products in those years. The statistics on imports combine the two products and also provide for inclusion of perchlorate of ammonia which, however, is understood not to have been imported.

Imports of Trinitrotoluol, Binitrotoluol,
1957 to 1963

	<u>'000 lb.</u>	<u>\$'000</u>
1957	10	5
1958	1,429	166
1959	4,283	324
1960	4,945	413
1961	3,895	378
1962	5,173	554
1963	2,182	303

Source: D.B.S., Trade of Canada, Imports, s.c. 8131

Statements made at the public hearing by the spokesman for C.I.L. that the requirements of DNT are about one-tenth those of TNT, suggest that DNT would possibly represent about one-tenth of the above quantity of imports. All imports were from the U.S.A. and in the years in which C.I.L. was not in production, most were made by that company. The data suggest that the demand for TNT in Canada is between four and five million pounds per year, with a commercial value of between \$800,000 and \$1,000,000. It is used by Canadian Industries Limited and Du Pont of Canada Limited for the manufacture of explosives; it may also be used by some mining and construction companies.

Establishing meaningful price data at the time of the hearing in 1962 was difficult because of war surplus supplies coming on to the U.S. market. With respect to TNT, the spokesman for C.I.L. commented on the situation as follows:

"The price of virgin material in the United States is in the area of 21½¢ per lb. f.o.b. Bauxdale, Wisconsin. In addition to that price there have, in recent years, been large supplies of reclaimed war surplus material available from the United States Government, which has been placed on the market for bids by independent purchasers and which has been sold on a tender basis. The prices at which this material has been sold have been down as low as, I think, 4¢ a pound f.o.b. at the point of their availability, and our delivered price of TNT in the last two years has been in the 9 to 12 cents area.

"We expect, however, that these supplies of war surplus materials will be diminishing, and, in fact, there is already an increase in price because of its increasing scarcity."(1)

For DNT, the price in 1962 was said to be 12 cents a pound or 19 cents a pound, depending on grade.

Tariff Considerations

Both TNT and DNT may be imported duty-free under tariff item 758 when imported by manufacturers of explosives for use exclusively in the manufacture of such articles in their own factories. In this item the products are referred to respectively as "trinitrotoluol" and "binitrotoluol." TNT may also be entered as an explosive under tariff item 666 at rates, per pound, of $1\frac{3}{4}$ cents, B.P., $2\frac{1}{4}$ cents, M.F.N. DNT is otherwise entered under tariff item 208t, Free, B.P., 15 p.c., M.F.N. Information available to the Board indicates that imports are entered duty-free under tariff item 758.

Canadian Industries Limited proposed that tariff item 758 be repealed with respect both to trinitrotoluol and binitrotoluol, and that the products should be dutiable at rates of 15 p.c., B.P., 20 p.c., M.F.N. under an item like B.T.N. heading 29.03.(2)

Du Pont of Canada, an important consumer of TNT, supported the request for 15 p.c., B.P., 20 p.c., M.F.N. for explosives, and stated that the company expected duties to be levied on its raw materials.

In support of its proposed rates of duty, C.I.L. noted that it was an efficient producer of TNT, and had a plant capable of supplying all Canadian requirements at reasonable prices. The duty was to encourage domestic users to obtain their supplies from the company. While the company had no intention of trying to meet the very low prices of the U.S. war surplus material, the company's spokesman expected the price of the TNT produced in Canada "to be less than the developed cost of the material produced in the United States." (3) The spokesman expressed the view that some users might be inclined to import TNT even if there was no price advantage in so doing; the duty would encourage them to give careful consideration to the C.I.L. quotation. Moreover, in the Great Lakes region, TNT might otherwise be landed from Wisconsin at lower cost than the C.I.L. material could be shipped from Beloeil, Quebec.

The company's argument for rates of 15 p.c., B.P., 20 p.c., M.F.N. for dinitrotoluol was similar to that for TNT; it is an efficient producer, capable of supplying any foreseeable future Canadian requirements at prices that would favour the use of the Canadian-made product.

(1) Transcript, Vol. 107, p. 16165-6

(2) Same, Vol. 107, p. 16161, 16164, 16180

(3) Same, Vol. 107, p. 16169

In presenting its proposal, therefore, Canadian Industries Limited did not suggest that the company was at any disadvantage in producing the materials, or that it anticipated any difficulty in meeting the normal commercial prices which might be expected to prevail in other countries. The U.S.A. was the only country referred to as possibly supplying any part of the market in Canada. The company did not refer to any specific advantage that it expected to gain from the proposed British preferential rate of 15 per cent.

Other Products of Heading 29.03

Apart from the interests noted above, there were very few products of the heading upon which representations were made.

Toluene sulphononic acid is used as a catalyst in manufacturing phenolic formaldehyde resin. Although the product is understood to be made in Canada, possibly by two companies, it has not been ruled to be of a kind made in Canada for tariff purposes, and may be imported under item 216, Free, B.P., 15 p.c., M.F.N. For use in the manufacture of synthetic resins, it may be entered duty-free under tariff item 921 as long as it is deemed to be not made in Canada for tariff purposes. Imports in the years immediately preceding the public hearing of 1961 appear to have been generally less than \$10,000 a year; more recent information is not available. The Plywood Manufacturers Association of British Columbia urged that the current rates of duty be left unchanged, and that the product, therefore, not be dutiable at rates of 15 p.c., B.P., 20 p.c., M.F.N. under the residual provision proposed by the Industry Committee for heading 29.03. The proposal by the Plywood Manufacturers Association was opposed by the spokesman for Lever Brothers Limited, a manufacturer of surface-active agents, on the grounds that only a small part of the acid is consumed in the manufacture of resin for plywood glues; the company supported the proposal for rates of 15 p.c., B.P., 20 p.c., M.F.N. The amount of toluene sulphononic acid used for plywood glues was not established, though the spokesman for Lever Brothers suggested that it might be in the order of 5,000 to 10,000 pounds and that Canadian production of the acid might exceed one and one-half million pounds.

A proposal for the continuation of tariff item 863 was made to the Board by Charles E. Frosst and Company in connection with p-toluene sulphononic acid, A.R. grade, which the company uses in the manufacture of steroid derivatives. The company stated that this chemical is not made in Canada and that, since the protection of Canadian industry is not involved, the cost of pharmaceutical chemicals made from it should not be subjected to an increase resulting from higher tariff rates. When it was shown by the spokesman for the Industry Committee that this chemical is made in Canada, the company agreed that products which are made here and which are freely available should not be imported duty free.(1)

Musk ambrette, musk xylol and moskene are chemicals not made in Canada, used in small quantities (15,000 pounds each per year) as ingredients for perfumes, soaps and detergents. Prices of these products vary considerably, depending upon type and grade of product but, in

(1) Transcript, Vol. 78, p. 11952

total, Canadian consumption of the above quantities would probably be less than \$100,000 a year. They are at present imported under item 208t, Free, B.P., 15 p.c., M.F.N., and representations were made by Lever Brothers Limited to have the products enter duty-free until made in Canada; the company thought it unlikely that any company will undertake to produce these chemicals in Canada. The Toilet Goods Manufacturers Association recommended free entry unless the product is "manufactured or produced in the British Commonwealth and available for export" in which instance the Association would recommend free entry from B.P. countries and a rate of $7\frac{1}{2}$ p.c., M.F.N.⁽¹⁾

Subsequent information indicates that musk ambrette is more properly classified under B.T.N. heading 29.08

The Toilet Goods Manufacturers Association submitted that end-use provisions in the tariff are necessary and justified for goods required by industry as raw materials, particularly when they are not made in Canada. Tariff item 264(a), under which essential oils may be imported, is not within the terms of Reference 120; the "n.o.p." provision of that item could result in certain chemicals being classified to B.T.N. Chapter 29 and excluded from entry under tariff item 264(a) with the resulting loss of the present end-use treatment. The Association recommended that the n.o.p. provision be removed from item 264(a) or that the Board make a recommendation of similar intent. In addition to the chemicals noted above, the Association listed musk and nitro benzol.

The Canadian Pharmaceutical Manufacturers Association submitted to the Board a list of chemicals used by its members in the manufacture of pharmaceutical products and recommended that some end-use treatment be adopted for these chemicals. The Association recommended that rates of Free, B.P. and 15 p.c., M.F.N. apply when the products are not made in Canada and that the heading rates proposed by the Industry Committee (15 p.c., B.P., 20 p.c., M.F.N.) apply when they are made in Canada. The chemicals in the present heading to which this proposal applies are:

methanesulphonate hydrochloride
methanesulphonate for ampoules
methanesulphonate sulphate

methanesulphonic acid
toluene-3:4-disulphonic acid
toluene-p-sulphonic acid

The Canadian Federation of Agriculture recommended that free entry for chloropicrin, under tariff item 219e, be continued when the product is to be used for combatting destructive insects and pests.

Chlorfenson and pentachloro nitrobenzene were the subject of an expression of interest by a group of formulators of pesticides at the hearing on pesticides, insecticides, etc. of B.T.N. heading 38.11, November 21, 1962. The companies included these chemicals on a list of raw materials, entered principally duty-free under item 791. The

(1) Transcript, Vol. 45, p. 6725

companies requested that the rates be not appreciably increased on the raw materials, at least until a given material is made in Canada, at which time the companies agreed with the Industry Committee that the material should become subject to the rates of duty provided for the heading.(1)

The Industry Committee stated its belief that all products of heading 29.03 which had commercial significance at the time of the hearing in 1961 were dealt with in submissions before the Board.

(1) Transcript, Vol. 108, p. 16333

ALCOHOLS AND CERTAIN DERIVATIVES

B.T.N. 29.04, 29.05, 15.10, 15.11, 22.08 AND 22.09

This section of the report draws together the representations made on a group of related products at the hearing commencing June 12, 1961. By the B.T.N. system, most alcohols of commercial importance are classified under heading 29.04, but there are important exceptions. Ethyl alcohol is classified by headings 22.08 and 22.09; glycerol is provided for in heading 15.11, and crude fatty alcohols are under heading 15.10.

In terms of commercial importance in Canada, ethyl alcohol is by far the most significant of these products, being potable alcohol found in beverages. However, only the non-beverage uses of ethyl alcohol are part of this study. Other products of considerable commercial importance in this group include glycerol, methyl alcohol, pentaerythritol, ethylene glycol and the fatty alcohols. In terms of total commercial value, the use in Canada of all the products here grouped (excluding the beverage use of ethyl alcohol) might be in the order of about \$45 million, of which imports supply more than 10 per cent, in large part of products not made in Canada.

Many of the products which are made in Canada are dutiable at rates of 15 p.c., B.P., 20 p.c., M.F.N.; those not made in Canada are generally either free of duty or dutiable at 15 p.c., M.F.N. Two important exceptions are ethyl alcohol and methyl alcohol, the latter when used for purposes other than the manufacture of formaldehyde. These bear extremely high rates of duty based upon their proof spirit content. In general, most of the representations made before the Board were for maintenance of the existing rates of duty for the products which depend generally upon whether or not they are made in Canada.

The products are dealt with in the following pages grouped according to the B.T.N. classification. While all of the products are alcohols or related chemicals, they cover a wide range of uses. One group might be considered very broadly as consisting of a number of industrial alcohols, used generally as solvents often in the manufacture of paints, synthetic resins and foods. Another group is used for the production of esters preparatory to the manufacture of plasticizers; the alcohols of this group also are used in flavouring and perfumery. The fatty alcohols find their principal use in surface-active agents, for example, in household detergents.

ACYCLIC ALCOHOLS AND THEIR HALOGENATED, SULPHONATED,
NITRATED OR NITROSATED DERIVATIVES - B.T.N. 29.04

INTRODUCTION

Alcohols are organic chemicals obtained by replacing one or more of the hydrogen atoms of a hydrocarbon by a like number of hydroxyl groups. They are oxygenated compounds which react with acids giving the compounds known as esters. Alcohols may be designated as primary, secondary or tertiary, depending upon whether the carbon atom linked to the hydroxyl group has one, two or three bonds to other carbon atoms.

The alcohols are also known as monohydric, dihydric and polyhydric depending upon the number of hydroxyl groups in the molecule.

The Brussels system classifies these alcohols as monohydric and polyhydric, and breaks down the monohydric alcohols into saturated monohydric alcohols, and their derivatives, and unsaturated monohydric alcohols, and their derivatives. B.T.N. heading 29.04 deals with acyclic alcohols derived from the acyclic (i.e. straight or branched chain) hydrocarbons of heading 29.01. It includes, in addition to the acyclic alcohols, their halogenated, sulphonated, nitrated, sulpho-halogenated, nitrohalogenated, nitrosulphonated or nitrosulphohalogenated derivatives. In addition, the aldehyde bisulphite compounds and ketone-bisulphite compounds are classified in the Brussels Nomenclature as sulphonated derivatives of alcohols.

Ethanol and glycerol, whether or not chemically pure, and crude fatty alcohols are excluded from this heading and are classified in B.T.N. 22.08 -.09, 15.11 and 15.10, respectively. However, since they are closely related to the chemicals of this heading, they are considered in this part of the report.

The tabulation which follows lists the principal alcohols of heading 29.04 according to whether they are monohydric, dihydric or polyhydric; the monohydrics are grouped according to the number of carbon atoms in the molecules. The carbon ranges are shown with some overlap to indicate that the products tend to form a continuous series rather than well defined separate groupings. For many uses some mixture of alcohols of related carbon composition can be used in place of a single, separately defined alcohol. However, some divisions do exist. The alcohols of the C₁ and C₂ to C₆ groups, together with ethyl alcohol, comprise the principal industrial solvents; those of the C₆ to C₁₁ and C₁₃ group are principally used for the production of esters preparatory to the manufacture of plasticizers; they are also used in perfumery and flavouring; the alcohols of the C₁₂ to C₁₈ group are used principally as surface-active agents, as are the fatty alcohols of heading 15.10.

The dihydrics and polyhydrics have uses generally different from the monohydrics, except that pentaerythritol and trimethylol ethane, both important industrial alcohols, are somewhat similar in use to some of the monohydric alcohols. Glycerol of heading 15.11 shares some uses with the dihydric glycols.

Acyclic Alcohols of B.T.N. 29.04

I Monohydric:

- | | |
|---------------------|------------------------------------|
| 1) Group C-1 | methanol |
| 2) Group C-2 to C-6 | butyl alcohols (normal- and iso-) |
| | propyl alcohols (normal- and iso-) |
| | methyl isobutyl carbinol |
| | 2-ethyl butanol |

I	Monohydric: (Cont'd)	
	3) Group C-6 to C-11 and C-13	2-ethyl hexanol nonanol isodecanol tridecanol citronnellool geraniol linalol nerol rhodinol
	4) Group C-12 to C-18	used in surface active agents; none mentioned separately
	5) Group C-18	commercially unimportant; none mentioned
II	Dihydric	ethylene glycol propylene glycol hexylene glycol
III	Polyhydric	pentaerythritol
		trimethylol ethane
		2-methyl-2n-propyl-1,3 propanediol
		mannitol
		sorbitol

This part of the report is organized according to the classification above.

Formaldehyde sodium bisulphite is dealt with last, as a sulphonated derivative of alcohols. It was the only derivative of alcohols which was the subject of a separate representation, though a number of others were listed in a more general submission and are noted in a later part of this Chapter.

Of the products under heading 29.04, ethylene glycol and pentaerythritol have the greatest commercial importance in Canada, followed by methyl alcohol and isopropyl alcohol.

The Industry Committee expressed the belief that all products of heading 29.04 which had commercial significance at the time of the hearing were dealt with in the submissions.

I - Monohydric Alcohols

Methyl Alcohol

Methyl alcohol (methanol) is a highly toxic, flammable liquid sometimes known as wood alcohol since it was originally produced by the destructive distillation of wood, a process no longer used in Canada. It is made in large volume in Canada by two companies, Canadian Chemical Company Limited at Edmonton, Alberta and Canadian Industries Limited at Millhaven, Ontario. Imperial Oil Limited has announced plans for a methanol plant at its Montreal East refinery, expected to be in produc-

tion in mid-1967. Canadian Chemical Company synthesizes methanol from hydrocarbon feed stock and stated that the company, at the time of the hearing in 1961, "accounts for upwards of 90% of Canadian production."⁽¹⁾ The company stated that its production "would be of the order of 50 million pounds per annum."⁽²⁾ The production by Canadian Industries Limited is directly associated with the production of terylene. Both companies produce methanol for merchant sale, though Canadian Chemical Company has a captive use for a small quantity for inhibiting formaldehyde during shipment. This company is said to be contemplating the building of an additional plant in eastern Canada, to be on stream in 1966. Factory shipments of methanol were estimated by a trade publication to have been 44 million pounds in 1963 and domestic consumption to have been 50.8 million pounds.⁽³⁾ This consumption would have a commercial value of between 2 and 3 million dollars.

Consumption of Methyl Alcohol
By Industry, 1962, 1963

<u>Industry</u>	<u>1962</u> '000 Imperial Gallons	<u>1963</u>
Paint and varnish	127	144
Distilleries	112	111
Plastics & synthetic resins	2,269	2,546
Industrial chemicals	2,506	2,614
Other chemical industries	58	354
Other industries	<u>594</u>	<u>565</u>
Total above	5,666	6,332

Source: Chemistry in Canada, July 1965, p. 57

Most methanol, possibly 85 or 90 per cent, is used in Ontario and Quebec; the manufacture of formaldehyde in that region was said to use some 65 per cent of all of the methanol produced. Some 15 to 20 per cent of consumption was said to be as an additive to gasoline and for injection into natural gas pipe lines, uses which rely on methanol's ability to absorb water and lower its freezing point. There are a number of minor uses.

Canadian Chemical Company ships methanol by tank car from Edmonton in competition with water-borne imports to the Shawinigan Chemicals Limited plant at Varennes, Quebec or to the Union Carbide plant at Belleville, Ontario. The tanker rate to Varennes from U.S. Gulf ports was reported to be 2 or 3 cents per U.S. gallon, and the rail rate from Edmonton, about \$1.40 per hundredweight. This rail freight is equivalent to approximately 9.3 cents per U.S. gallon, indicating a freight disadvantage to the producer in Edmonton of just over 6 or 7 cents per U.S. gallon when supplying the market at Varennes.

⁽¹⁾ Transcript, Vol. 47, p. 6975

⁽²⁾ Same, Vol. 57, p. 8590

⁽³⁾ Canadian Chemical Processing, July 1965, p. 70

The U.S. price at the time of the hearing was reported to be about 30 cents per U.S. gallon, in tank car lots, but possibly in the order of 23 cents when shipped by water in tankers. Thus, the supplier at Edmonton, in seeking to sell to Shawinigan Chemicals at Varennes, would have to be prepared to take a return at plant of about 17 cents per U.S. gallon, or approximately 20.4 cents per Imperial gallon whenever the customer could purchase the U.S. material at 23 cents plus ocean freight of 3 cents per U.S. gallon. This price, however, is likely to be lower than the average of typical purchases, suggesting that the landed cost of methanol, when purchased in large quantities in Central Canada for the manufacture of formaldehyde, may be something in the order of 30 cents per gallon.

The spokesman for Canadian Chemical Company Limited said that most of the company's sales are to the two producers of formaldehyde on a negotiated price basis. Because methyl alcohol for use in making formaldehyde can be entered into Canada duty free under temporary tariff item 158(a) and the Canadian manufacturer must compete directly with imports, these prices were said to be "very, very much lower" than prices to other users.⁽¹⁾ For this reason, published prices are not representative for the major portion of sales in Canada, but a comparison of United States and Canadian prices is given in the following table. These prices are not corrected for the exchange rate nor for the difference in the size of the Imperial and the U.S. gallon, but the wide discrepancy in the published prices is obvious. Canadian Chemical indicated that prices have been stable since 1957 or 1958.

Delivered Prices of Methanol Canada
and the United States
1959 - 1965

<u>Year</u>	<u>Canada</u>	<u>United States</u>
	Cdn.\$/Imperial gallon	U.S.\$/U.S. gallon
1959	.62 $\frac{1}{2}$	.29
1960	.62 $\frac{1}{2}$	.30
1961	.62 $\frac{3}{4}$	.30
1962	.62 $\frac{1}{2}$	.30
1963	.62 $\frac{1}{2}$	.30
1964	.62 $\frac{3}{4}$	.30
1965	.62 $\frac{3}{4}$	.30

Source: Canadian Chemical Processing; Oil, Paint and Drug Reporter

Imports of methanol to Canada in selected years are shown in the following table. All of these came from the United States; most have been entered free of duty, likely under tariff item 158(a). Up to 1963, the statistical class referred to ethyl and methyl alcohol and to mixtures of methyl alcohol; however, the data are thought to be nearly all for methanol. In 1964, the statistical class refers only to methyl alcohol. Exports were said to be insignificant.

⁽¹⁾ Transcript, Vol. 47, p. 6990

Imports of Methyl Alcohol to Canada,
Selected Years

<u>Year</u>	<u>Imports</u> million pounds	<u>Value</u> \$'000	<u>Unit</u> <u>Value</u> ¢/lb.
1957	13.6	519	3.9
1959	26.4	945	3.5
1961	8.8	323	3.6
1962	10.3	410	4.0
1963	7.2	289	4.0
1964	6.3	276	4.0

Source: D.B.S., Trade of Canada, Imports; data for years 1957-63 converted from published gallons

Tariff Considerations

Methyl alcohol is at present entered into Canada for general use under tariff item 158 at a rate of 20 cents per proof gallon under all Tariffs. The 20 cents per proof gallon was said to amount to about 35 cents per Imperial gallon of pure alcohol, which is equivalent to an ad valorem rate of approximately 100 per cent. When used in the manufacture of formaldehyde, however, methanol may be entered free of duty under tariff item 158a; in 1964, more than 95 per cent of the imports were duty-free. Mixtures of methyl alcohol and other ingredients when imported by tanners for use as a solvent for dyes for the dyeing of leather are dutiable, under tariff item 158b, at 5 cents per proof gallon under the B.P. and M.F.N. Tariffs. No representations were made to the Board concerning such mixtures; they would not be classified by B.T.N. heading 29.04, but likely as miscellaneous preparations under heading 38.19, or possibly under Chapter 32 as preparations specifically for use in dyeing.

Only one of the manufacturers, Canadian Chemical Company Limited, appeared before the Board on methanol. The company recommended rates of 15 p.c., B.P. and 20 p.c., M.F.N., and also the elimination of the end-use item 158(a). The company spokesman noted that by this proposal it would lose the effective rate of about 100 per cent which at present applied to approximately one-third of its sales; on these sales, its price has reflected, in large part, this rate of duty. The high price on these sales was used to offset the much lower realized return on sales of methanol for the manufacture of formaldehyde "to give a decent average price." On balance, it was the company's contention that the proposed rates of 15 p.c., B.P., 20 p.c., M.F.N. would result in a net loss for the company overall, but that the proposed rates represented "a sensible and reasonable arrangement between the various users of methanol ..."(1) No reason was advanced by the company for the proposed 15 p.c. rate under the British Preferential Tariff, though the proposal was consistent with the company's general position that uniform rates of 15 p.c., B.P., 20 p.c., M.F.N. should normally apply to chemicals.

(1) Transcript, Vol. 47, p. 6987

At the hearing on formaldehyde, September 13, 1961, when end-use item 158a was called for consideration, Shawinigan Chemicals Limited proposed that the duty-free entry of methanol, under this item, be continued. The company pointed out that its production of formaldehyde and pentaerythritol was predicated on the availability of cheap methanol.

"Fundamental to the economics of the project was the cost, delivered to our plant, of methanol, the basic raw material in our process for making formaldehyde. If we could obtain methanol at the prices that applied to large volume purchases, e.g., 1,000,000 gallons at a time, and if the transportation costs on the methanol could be kept to a minimum, the project would be soundly based. Volume prices could be obtained by buying in tanker loads. Low transportation costs could be achieved only by locating at a point where ocean tankers could deliver the material directly. We, therefore, went ahead on this basis at Varennes, Quebec."(1)

Tariff item 158a was introduced into the Customs Tariff, as a temporary item, in February, 1950 and has been renewed continuously since that time. If the removal of duty-free entry came about, Shawinigan Chemicals could expect to pay a higher price for its basic raw material whether it imported it or purchased it from the domestic producer. This additional cost was represented by the company as being a matter of major concern to it.

"We thus find ourselves in a position where our competitor can not only control the price of our final product, pentaerythritol, which he makes in quantities far in excess of the Canadian market from otherwise waste material, but seeks through the elimination of Item 158a to control the price of our basic raw material as well. The nature of their operation is such that formaldehyde can be costed into pentaerythritol at almost any price, and the cost of methanol is similarly almost anything they care to make it."(2)

The Plywood Manufacturers Association of British Columbia urged that the present tariff treatment be left unchanged, noting that methanol is used to make formaldehyde which itself is used in making adhesives for plywood. The Association deplored any change which would increase the cost of making plywood.

This chemical is one in which Polymer Corporation Limited expressed an interest saying that the company considers it essential that the duty-free tariff provisions in respect of materials for use in the manufacture of synthetic rubber, now contained in item 851, be continued.

Methanol was included in a list submitted to the Board by the Canadian Pharmaceutical Manufacturers Association of the more important chemicals to its members. The Association recommended that "some end-use treatment be adopted" for chemicals used in the manufacture of

(1) Transcript, Vol. 56, p. 8505-6

(2) Same, Vol. 56, p. 8513-4

pharmaceutical products. The Association proposed rates of 15 p.c., B.P., 20 p.c., M.F.N. for such products when they are made in Canada.

Union Carbide Canada Limited has produced formaldehyde in its Bakelite Division at Belleville, Ontario, since 1953. The company did not make a submission on end-use item 158a, or when methanol was called for hearing. In its representation on formaldehyde, the company noted that it used methanol in the production process and that barges using inland waterways or ocean-going tankers, of certain load sizes could dock at Belleville. The company, however, did not request retention of duty-free entry for methanol, but noted that there was a relationship between the rates of duty on the material and those on the products.

"Of course, we don't want to be put in a position where we are paying more for the raw material and not obtaining like protection in regard to the ultimate product ... We have no objection ... if 15 and 20 is put on methanol, but we also ask that 15 and 20 be put on formaldehyde, but this is not the only basis upon which we ask that it be put on formaldehyde."(1)

The spokesman stated that Union Carbide purchased methanol from Canadian Chemical Company. It might also be noted that Canadian Industries Limited also produces methanol at Millhaven, Ontario. Both the production by C.I.L. and the use by Union Carbide are understood to be very much smaller factors in the market than the substantive interests expressed by Canadian Chemical Company Limited, as a producer of methanol, and Shawinigan Chemicals Limited, as a user.

The Canadian Pulp and Paper Association expressed an interest in methanol which its members use in the manufacture of chlorine dioxide. The Association noted that it opposed any increase in rates of duty on chemicals used in the pulp and paper industry.

Butyl Alcohol

Butyl alcohol is a name designating four isomers which are separately identified as normal butyl alcohol, iso-butyl alcohol, secondary butyl alcohol and tertiary butyl alcohol. Only the first two were brought before the Board for discussion at the time of the hearing in 1961, although Shell Canada Limited makes secondary butyl alcohol at its Montreal East petroleum refinery and is expected to bring a new plant on stream late in 1965 for its manufacture. There is a high degree of interchangeability among the butyl alcohols and they are named in tariff item 207a as butyl alcohol, n.o.p.

Both normal and iso-butyl alcohols are water-white liquids produced from hydrocarbon feed stocks. Both are produced by Canadian Chemical Company Limited and the normal isomer is produced in addition by Shawinigan Chemicals Limited. As noted above, Shell makes secondary butyl alcohol.

(1) Transcript, Vol. 56, p. 8486

Normal butyl alcohol is used in the production of dibutyl phthalate plasticizer, in the formulation of 2-4-D herbicide, in the production of butylated urea and melamine resins, as a solvent in nitrocellulose lacquers, in brake fluids and in a number of additional minor applications. Canadian Chemical Company uses some normal butyl alcohol captively in making butyl acetate but stated that sales "have been substantial."⁽¹⁾ Secondary butyl alcohol is used in making methyl ethyl ketone and as a solvent in paint, varnish and lacquer. Shell Canada Limited is reported to have a plant under construction for methyl ethyl ketone.

Up to the time of the hearing, most iso-butyl alcohol was used captively by Canadian Chemical Company in making iso-butyl acetate. The discontinuation of the latter product, however, was expected to make some iso-butyl alcohol available for sale; the actual volume was in doubt because the processes involved might be adjusted, releasing less than might be anticipated.⁽²⁾ The major non-captive uses of iso butyl alcohol in Canada are in the production of 2-4-D herbicide and iso-butylated urea resin. The butyl alcohols were said to be consumed in the millions of pounds annually. Shawinigan Chemicals Limited estimated that 1,877,125 pounds of butyl alcohol were used in 1959 as a solvent in paint, varnish and lacquer and a further two million pounds was estimated to have been used to make butyl acetate, also used as a solvent by the same industry.⁽³⁾

Consumption of Butyl Alcohol
By Industry, 1960-1962

<u>Industry</u>	<u>1960</u>		<u>1961</u>		<u>1962</u>	
	<u>'000 lb.</u>	<u>\$'000</u>	<u>'000 lb.</u>	<u>\$'000</u>	<u>'000 lb.</u>	<u>\$'000</u>
Paint & varnish	2,094	347	2,323	387	2,839	481
Other Chemical						
Industries	503	73	284	40	732	129
Industrial						
chemicals	<u>1,460</u>	<u>208</u>	<u>1,904</u>	<u>270</u>	<u>4,280</u>	<u>578</u>
Total	<u>4,057</u>	<u>628</u>	<u>4,511</u>	<u>697</u>	<u>7,851</u>	<u>1,188</u>

Source: D.B.S., various publications

Data on imports of all of these butyl alcohols are included together in statistical class 8034. The imports shown in the following table were almost entirely from the U.S.A., except for 1,734,170 pounds, valued at \$279,446 imported in 1962 from the United Kingdom. Imports of iso-butyl alcohol were said to represent a substantial part of the market. The manufacturer of 2-4-D was thought to import a mixture of normal and iso butyl alcohol.⁽⁴⁾

(1) Transcript, Vol. 48, p. 7156

(2) Same, Vol. 48, p. 7172-3, 7175

(3) Same, Vol. 46, p. 6884-5

(4) Same, Vol. 48, p. 7161

Imports of Butyl Alcohol
1959-64

<u>Year</u>	<u>Total</u> <u>Imports</u> '000 lb.	<u>Total</u> <u>Value</u> \$'000	<u>Unit</u> <u>Value</u> \$/lb.	<u>Dutiable</u> <u>Imports</u> '000 lb.
1959	1,542	202	.13	531
1960	1,241	171	.14	133
1961	1,478	214	.14	393
1962	3,698	544	.15	145
1963	3,263	440	.13	715
1964	1,430	168	.12	1,225

Source: D.B.S., Trade of Canada, Imports

Normal butyl alcohol is, apparently, exported to the U.K. and Europe, while iso-butyl alcohol is not exported from Canada in significant amounts.

The published prices of normal butanol and iso-butanol in Canada and the United States are shown in the following table. Both are in tank car quantities and on a delivered basis.

Prices of Normal Butanol and Iso Butanol
Canada and the United States

<u>Normal-Butanol</u>		<u>Iso-Butanol</u>	
Canada	U.S.A.	Canada	U.S.A.
- cents per pound -			
1959	16 $\frac{1}{4}$	15	14
1960	16 $\frac{1}{4}$	15 $\frac{1}{2}$	13
1961	16 $\frac{1}{4}$	15 $\frac{1}{2}$	13
1962	16 $\frac{1}{4}$	15 $\frac{1}{2}$	13
1963	16 $\frac{1}{4}$	15 $\frac{1}{2}$	13
1964	16	10	11 $\frac{1}{2}$
1965	15 $\frac{1}{4}$	10	11 $\frac{1}{2}$

Source: Canadian Chemical Processing and Oil, Paint and Drug Reporter

Tariff Considerations

All the isomers of butyl alcohol are included in tariff item 207a, "Butyl alcohol, n.o.p." at rates of Free, B.P. and 20 p.c., M.F.N. End-use item 791 allows butyl alcohol to be entered into Canada duty-free for the manufacture of insecticides. As shown earlier in the table on imports, much the greater part of the imports is duty-free.

Canadian Chemical Company Limited and Shawinigan Chemicals Limited made representations on butyl alcohols. Shawinigan maintained that the broad competitiveness among these alcohols illustrates the need for general heading rates and said:

"This broad competitiveness illustrates the need for general heading rates. The market for C₄ alcohols or products made from them changes, or can change, simply by a shift in relative price to another alcohol or mixtures of several alcohols. Any attempt to accord any exception in this group would simply tend to encourage the use of non-Canadian alcohols at the expense of the Canadian producers. Nor is there any sound reason why the various alcohols in this range that are made in Canada should be accorded different rates one from the other."(1)

The heading rates which were generally proposed were 15 p.c., B.P., 20 p.c., M.F.N. Canadian Chemical Company recommended rates of 15 p.c., B.P. and 20 p.c., M.F.N., saying that the proposed increase in the British preferential rate is "more ... a matter of consistency than of logic."(2)

This chemical was included in a list submitted to the Board by the Canadian Pharmaceutical Manufacturers Association in recommending that "some end-use treatment be adopted" for chemicals used in the manufacture of pharmaceutical products. The Association suggested that rates of Free, B.P. and 15 p.c., M.F.N. should apply when the chemicals are not made in Canada and that the heading rates suggested by the Industry Committee (15 p.c., B.P. and 20 p.c., M.F.N.) apply when they are made in Canada.

Propyl Alcohols

The two isomers of propyl alcohol are normal propyl alcohol and isopropyl alcohol. They have little in common except their chemical formula. Both are clear, colourless liquids and in common with the other low carbon alcohols, have good solvent characteristics.

Isopropyl alcohol, (or isopropanol) is the more important of the two. It is used as a solvent in lacquers, paints, resins, gums and essential oils, in hydraulic fluid and anti-freeze preparations and as a germicide in liniments, cosmetics and pharmaceuticals. It is also used in the production of isopropyl acetate, a lacquer solvent.

At the time of the hearing it was made in Canada by B.A.-Shawinigan Limited, now part of Shawinigan Chemicals Limited, and Shell Canada Limited. Shell's reported new facilities at Montreal East for making methyl ethyl ketone and secondary butyl alcohol, to come on stream late in 1965, are expected to free the older facilities for increased production of isopropyl alcohol and acetone.(3) Because facilities can be shifted from manufacturing one product to making another, plant capacity is quite indeterminate but was said by Shawinigan to be ample to supply Canadian needs.(4) At B.A.-Shawinigan's plant at Montreal the acetone manufactured as a co-product in making phenol is further processed with hydrogen into isopropyl alcohol, in order to develop a diversified and expanded market for acetone.

(1) Transcript, Vol. 46, p. 6895

(2) Same, Vol. 48, p. 7163

(3) Canadian Chemical Processing, November, 1964

(4) Transcript, Vol. 47, p. 7033

Imports of isopropyl alcohol declined from 1959 to 1963, except for 1962; all have been from the United States. Imports of this magnitude are very small compared with domestic production of many million pounds. There are no known exports of isopropyl alcohol.

Imports of Isopropyl Alcohol
1959-63

<u>Year</u>	<u>Quantity</u> '000 gallons	<u>Value</u> \$'000	<u>Unit</u> <u>Value</u> \$/gal.
1959	22	12	.55
1960	16	10	.65
1961	7	6	.87
1962	14	11	.81
1963	4	5	1.10

Source: D.B.S., Trade of Canada, Imports

The Canadian published price has been steady at 73 cents per Imperial gallon since 1959, while in the same period of time the published price in the U.S.A. has remained at 46 cents per U.S. gallon, equivalent to about 55 cents per Imperial gallon. As with many chemicals, however, shipments are likely to be made at discounts from a given price, and the price differential is not necessarily as great as this difference indicates.

Tariff Considerations

Isopropyl alcohol currently is entered into Canada under tariff item 157c at rates of Free, B.P. and 25 cents per gallon, M.F.N. (GATT). It may be entered duty-free under tariff item 219a(ii) if for use as a pesticide.

B.A.-Shawinigan Limited and the Rubber Association of Canada made representations before the Board on this chemical. B.A.-Shawinigan proposed that a rate of 15 p.c., B.P. and 20 p.c., M.F.N. should be applied to imports of "all this range of saturated monohydric alcohols."⁽¹⁾ The Rubber Association opposed any "proposal that may be submitted to the Board for an increase in the present M.F.N. duty on isopropyl alcohol"⁽²⁾, but concurred with the Industry Committee's proposal for 15 p.c., B.P. and 20 p.c., M.F.N.

This chemical was included in a list submitted to the Board by the Canadian Pharmaceutical Manufacturers Association of products of importance to its members in recommending that "some end-use treatment be adopted" for chemicals used in the manufacture of pharmaceutical products. The Association suggested that rates of Free, B.P. and 15 p.c., M.F.N. should apply when the chemicals are not made in Canada and that the heading rates suggested by the Industry Committee (15 p.c., B.P. and 20 p.c., M.F.N.) apply when they are made in Canada.

⁽¹⁾ Transcript, Vol. 47, p. 7035

⁽²⁾ Same, Vol. 47, p. 7056

Normal propyl alcohol is made in Canada only by the Canadian Chemical Company Limited, whose capacity to produce it was said to be a considerable multiple of the market in Canada.⁽¹⁾ It is made from hydrocarbon feed stocks at Edmonton, Alberta. Some of the product is used captively in making normal propyl acetate but the major, non-captive use in Canada is in the manufacture of flexible printing inks for polyethylene film; it is also used as a solvent. Over 80 per cent of domestic sales were said to occur in Ontario and Quebec.

Imports were believed to be negligible, while exports of this chemical are "a large and growing element" of the company's export programme.⁽²⁾ Published prices have been constant at 11½ cents per pound in both Canada and the United States since 1959.

The tariff item under which normal propyl alcohol is imported is 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. Canadian Chemical Company, the only company to appear before the Board on this chemical, wants it to remain dutiable at these rates. No representation was made as to why these rates were regarded as appropriate specifically for normal propyl alcohol; they were the rates more generally favoured by the company.

Normal propyl alcohol was included in a list submitted to the Board by the Canadian Pharmaceutical Manufacturers Association of chemicals of minor importance to its members in recommending that "some end-use treatment" be adopted for chemicals used in the manufacture of pharmaceutical products. The Association suggested that rates of Free, B.P. and 15 p.c., M.F.N. should apply when the chemicals are not made in Canada and that the heading rates suggested by the Industry Committee (15 p.c., B.P. and 20 p.c., M.F.N.) apply when they are made in Canada.

Other Alcohols in the C2 to C6 Range

Shawinigan Chemicals Limited noted that, "The major alcohols in the C2 to C6 range are made in Canada. For example, ethanol (C2), propanol (C3), butanol (C4), fusel oil (an impure amyl alcohol, C5), hexanol (C6), are all made in Canada." The company said that these alcohols are all competitive with one another, particularly in solvent applications, and their various combinations or mixtures are used, depending upon prices. Ethanol is discussed below under heading 22.08; propanol and butanol have been dealt with above; fusel oil is dealt with as a mixture under heading 38.19; no submissions were made specifically on hexanol; N-hexanol is named in tariff item 875a which provides duty-free entry for a number of chemicals for use in the manufacture of antibiotics and certain other pharmaceutical products.

A minor member of this group of alcohols that was brought to the Board's attention is methyl isobutyl carbinol, variously known as methyl amyl alcohol and 4-methyl pentane-2-ol. At the time of the hearing, in June, 1961, Canadian Chemical Company Limited was the only producer, but B.A.-Shawinigan Limited stated that the company expected to

(1) Transcript, Vol. 47, p. 7024

(2) Same, Vol. 47, p. 7022

produce it "within the year."⁽¹⁾ It is made by reacting acetone with itself in a process known as aldoling; methyl iso butyl ketone is a co-product and the relative volume of each produced can be controlled within broad limits.

Methyl isobutyl carbinol is, in common with the other alcohols, used as a solvent; it is also used in hydraulic fluids and as a frothing agent in ore flotation. Canadian Chemical Company said "this is a relatively small volume item."⁽²⁾ In discussing its interchangeability with other alcohols the company spokesman noted: "it is extraordinarily difficult to say there is a given demand for methyl amyl alcohol ... There are alternative alcohols which are equally suitable ... I don't think anyone could truthfully say with any assurance just what the demand for methyl amyl alcohol is."⁽³⁾ Captive use by Canadian Chemical Company for making methyl amyl acetate was said to be substantially larger than sales although the volume used was small. Imports and exports are negligible.

Canadian Chemical Company said that, because the major commercial use for this chemical is as a frothing agent in the recovery of metals from ores, a major portion of the Canadian company's sales is at the United States price. For this use it was said to be entered "erroneously" under tariff item 270 which is "oil for use in the concentration of ores."⁽⁴⁾ Originally pine oil was used in the flotation process, and methyl isobutyl carbinol has been "ruled as an oil."⁽⁵⁾ The rate is Free under all Tariffs. The more appropriate tariff item is probably 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. Both companies, B.A.-Shawinigan and Canadian Chemical, recommended that rates of 15 p.c., B.P. and 20 p.c., M.F.N. should apply.

Other alcohols in the C2 to C6 range were not specifically brought to the Board's attention. However, Shawinigan Chemicals Limited noted that the broad competitiveness of these alcohols "illustrates the need for general heading rates ... Nor is there any sound reason why the various alcohols in this range that are made in Canada should be accorded different rates one from the other."⁽⁶⁾ The company proposed that "no exception below the heading rates be granted on saturated monohydric alcohols in this range that are classified under Heading 29.04."⁽⁷⁾

Nonanol, Isodecanol and Tridecanol

These alcohols, which are in the C6 to C13 groups, are made from the olefinic part of a hydrocarbon feedstock. They are not made in Canada and while, at the time of the hearing in 1961 they were not being used in Canada, Imperial Chemical Industries Limited, by whom they are made in England, "confidently expected ... that prior to the

(1) Transcript, Vol. 47, p. 7040

(2) Same, Vol. 47, p. 7059

(3) Same, Vol. 48, p. 7140

(4) Same, Vol. 47, p. 7061

(5) Same, Vol. 48, p. 7144

(6) Same, Vol. 46, p. 6895

(7) Same, Vol. 46, p. 6856

conclusion of hearings on Reference No. 120 a sizeable market for them will have developed in Canada."(1)

These alcohols are used chiefly in making phthalate esters for use as polyvinyl chloride plasticizers. The plasticizers were claimed to have superior qualities that made them especially useful in extending the life of finished polyvinyl chloride plastics. Nonanol has a further specialized application in the manufacture of lubricants for such high performance applications as jet engines. The same chemical is useful for retarding sprouting in stored potatoes. Tridecanol is used in surface active agents.

Shawinigan Chemicals Limited pointed out that these alcohols are competitive in use with others that are made in Canada; the superiority of nonanol, isodecanol and tridecanol for the applications mentioned was denied by this company, who again asserted the interchangeability of the alcohols in use.(2)

Imperial Chemical Industries Limited noted that these alcohols may be entered into Canada under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. If for use in making plastics they may be entered free under end-use tariff item 921. Some entries might be duty-free under tariff item 219a, if for use as herbicides and some, possibly at rates of Free, B.P., 5 p.c., M.F.N., under item 220e, if of a class or kind not made in Canada and for use in the manufacture of additives for heating, lubricating and fuel oils. The company proposed that, if end-use items were "eliminated from the tariff it would be reasonable to apply to all imports of these alcohols the rates now provided for other uses under Item 208t. If and when any of these alcohols is made in Canada in quantity substantial in relation to Canadian requirements, I.C.I. would not object to the imposition of duty rates on that alcohol at 15 p.c., B.P. and 20 p.c., M.F.N. as has been proposed."(3)

Because alcohols made in Canada can be used to make products competitive with those made from nonanol, isodecanol and tridecanol, Shawinigan Chemicals Limited proposed that rates of 15 p.c., B.P. and 20 p.c., M.F.N. should apply.

Citronellol, Geraniol, Linalol, Nerol and Rhodinol

These alcohols are not made in Canada. Consumption is small in Canada and the products are imported from the United Kingdom. They are used in Canada in the manufacture of perfume, toilet preparations and related items.

W.J. Bush & Co. (Canada) Ltd. imports linalol from the parent company in England, using some of it and selling some to other Canadian manufacturers engaged in work similar to Bush, making flavouring essences and perfumery compounds. The company recommended that on imports of this product the rate of duty should continue to be Free, B.P. and 15 p.c.,

(1) Transcript, Vol. 48, p. 7184

(2) Same, Vol. 48, p. 7188

(3) Same, Vol. 48, p. 7187

M.F.N. as currently under tariff item 208t. When it becomes made in Canada, the rates could be 15 p.c., B.P. and 20 p.c., M.F.N. As noted below, the product, however, may be entered duty-free, as essential oils, under tariff item 264a.

The Toilet Goods Manufacturers Association submitted a proposal on all of these alcohols except nerol, showing the following data on consumption in the toilet goods industry in 1960:

Consumption of Specified Alcohols by the
Toilet Goods Industry

<u>Product</u>	<u>Volume</u> pounds	<u>Unit Value</u> \$ per pound
Citronellol	10,000	2.35
Geraniol	7,000	2.20
Linanol	3,000	3.50
Rhodinol	200	35.00

The Association noted that these alcohols are currently imported into Canada under tariff item 264a at rates of Free, B.P. and $7\frac{1}{2}$ p.c., M.F.N. Tariff item 264a, which relates to essential oils, is not within the terms of Reference 120.(1)

The Association recommended that the duty should remain at these rates if the alcohols are "manufactured or produced in the British Commonwealth and available for export, otherwise:- Free, B.P., Free, M.F.N. and Free, General."(2)

Recommendations concerning these same chemicals as well as nerol were brought before the Board by A. Boake, Roberts & Co. Ltd., of London, England who make them in the United Kingdom and sell them to Canadian manufacturers of perfumes, cosmetics, soaps and detergents. The company suggested that these alcohols should "be accorded duty rates of 0 per cent B.P. and 15 per cent M.F.N. until manufactured in Canada."(3)

The scope of headings such as 29.04 might present administrative difficulties with respect to existing item 264a. Many of the products of these headings are regarded in commerce as synthetic essential oils, and would be eligible for entry under item 264a unless the provisions of items worded like the B.T.N. headings were considered to provide more specifically for them and take precedence over item 264a. This problem is not unique to heading 29.04 or to item 264a, but is part of the general problem of defining the scope of the Reference in relation to other items in the Customs Tariff. The problem is dealt with more generally in the Introduction to the report and in the Summary and Conclusions.

(1) Transcript, Vol. 49, p. 7396

(2) Same, Vol. 49, p. 7397

(3) Same, Vol. 49, p. 7399

II - Dihydric Alcohols

The second principal class of acyclic alcohols are the dihydric alcohols. The three chemicals in this group to come to the Board's attention are dealt with on the following pages. They are:

- 1) Ethylene glycol
- 2) Propylene glycol
- 3) Hexylene glycol

Ethylene Glycol

The Product

Ethylene glycol is a colourless, syrupy liquid, miscible with water or alcohol and possessing a sweet taste and mild odour. It derives most of its commercial significance from the quality it possesses, when mixed with determinate volumes of water, of freezing at specific temperatures. Pure, it freezes at about 8° F, but mixed with an equal quantity of water, it freezes at about -35° F, and the freezing point can be further lowered, within limits, by increasing the proportion of glycol. Its boiling point is about 386° F.

As used for making anti-freezing compounds, it frequently is the predominant part of a mixture consisting of ethylene glycol (sometimes referred to as mono-ethylene glycol), diethylene glycol and triethylene glycol. While pure ethylene glycol may be used in anti-freeze, it is more usual to use the mixture. The mixture of the isomers are classified by B.T.N. heading 29.04. The anti-freeze preparations are dealt with in this report under heading 38.19.

Method of Manufacture

At its Montreal East chemical complex, Union Carbide Canada Limited produces ethylene glycol by reacting ethylene and air in the presence of a silver oxide catalyst to yield ethylene oxide. This, in turn, when mixed under pressure with water and a small amount of sulphuric acid, becomes ethylene glycol.⁽¹⁾

Dow Chemical of Canada Limited, at both Sarnia, Ontario, and Fort Saskatchewan, Alberta, uses the chlorohydrin process. Chlorine and ethylene are reacted together to form ethylene chlorohydrin; this is converted to ethylene oxide in a reaction with a lime slurry and the ethylene oxide is hydrated to ethylene glycol as described above.

The product of these reactions includes small amounts (about ten per cent and one per cent, respectively) of diethylene glycol and triethylene glycol. Evaporation and distillation remove the large quantity of water left by the process, and further distillation separates ethylene glycol from the other, co-produced, glycols if these are not desirable in the uses to which it is to be put.

(1) Transcript, Vol. 54, p. 8143-4

The amounts of the co-products actually produced can be adjusted to some degree by controlling the amount of water used in the reactions, but are governed largely by the need to achieve an economic balance between production cost and the revenue obtainable from the lesser co-products, for which there is little market. Removal of the water formed by the reaction adds considerably to the cost of production.

The Industry

In 1955, the Board reported, under Reference 114, the results of its study of ethylene glycol for anti-freeze, and of the ethylene glycol anti-freeze preparations. This study is not dealt with in this section of this report, though it is referred to in the section on anti-freeze preparations of heading 38.19.

The domestic manufacturers of ethylene glycol are Dow Chemical of Canada Limited and Union Carbide Canada Limited, whose capacity to produce ethylene glycol, at least since 1949, has apparently exceeded consumption. The combined capacity of the companies' two plants in 1954 was 80 million pounds annually, with the Dow plant at Sarnia, Ontario, capable of producing 50 million pounds a year and that of Union Carbide, at Montreal East, Quebec, (formerly owned by Dominion Tar and Chemical Company Limited) capable of 30 million pounds.⁽¹⁾ Information available to the Board reveals a very significant growth in capacity at each of these plants since 1954, in addition to the establishment of the newer Dow Chemical works at Fort Saskatchewan, Alberta, so that capacity has certainly more than doubled in the decade.

The Board was advised that the Canadian manufacturer of ethylene glycol is at a cost disadvantage relative to producers in the United States. The cost differential was attributed by Union Carbide to "differences in investment (depreciation), raw materials, operating and distribution costs."⁽²⁾ One consumer, Radio Oil Refineries Limited, suggested that the costs of seven cents per pound achieved in the United States could be realized by a proposed plant at Edmonton, Alberta.⁽³⁾ It should be noted, moreover, that Canadian plants have improved their position in recent years because a growing market has been shared by the two producers.

The Canadian plants are smaller than some in the U.S.A. which range up to 200 million pounds in annual capacity. However, even at the earlier hearings in 1954 the plants in Canada were larger than some U.S. plants which are reported to have an annual capacity of 20 million pounds.⁽⁴⁾ The largest U.S. plants are located around the Gulf of Mexico, an appreciable distance from the principal markets in Canada, although low-cost ocean freight was said to reduce considerably this disadvantage.

(1) Tariff Board, Report in Reference No. 114, Ethylene Glycol for Anti-freeze and Ethylene Glycol Base Anti-freeze, p. 6

(2) Transcript, Vol. 54, p. 8187

(3) Same, Vol. 145, p. 21594

(4) Industrial Chemicals, p. 382

While raw material costs might be slightly higher in Canada, it might be noted that at all three locations where ethylene glycol is produced in this country there are nearby sources of the principal raw materials, some of which are produced captively on site by the glycol producer.

Operating costs are associated with the product mix of a particular plant. Ethylene glycol is but one product of a plant which Dow described as a "complex". Union Carbide contended that the larger market outlet in the United States permitted the dedication of certain portions of a plant to the continuous manufacture of a specific product, whereas, in Canada, similar continuous operation is not possible.⁽¹⁾

The Market

The manufacture of anti-freezing compounds for liquid-cooled engines is the most important of the uses for ethylene glycol, taking some 75 per cent of the total.⁽²⁾ One gallon of anti-freeze consists of approximately 10.7 pounds of ethylene glycol or blends along with sufficient water, colouring, anti-foaming agents and rust inhibitors to bring the total weight to about 11.3 pounds. Since this market follows automobile concentration, it exists predominantly in Ontario and Quebec although it is substantial in all parts of the country. In general, the anti-freeze use is supplied by blends of the glycols not by pure mono-ethylene glycol.

Anti-freeze is manufactured by the two companies, Dow and Union Carbide, which make ethylene glycol and, in addition, by several other companies which buy ethylene glycol, mostly from the two Canadian producers, and blend anti-freeze for their own brands and their clients' accounts. Laurentide Chemicals Incorporated, a manufacturer of anti-freeze, estimated that, in 1962, approximately 80 million pounds of ethylene glycol were used in Canada for anti-freeze.⁽³⁾ Some indication of the growth of the market for ethylene glycol through its use for anti-freeze can be obtained from the number of motor vehicle registrations in Canada; these have increased from 3.4 million in 1953 to more than 6 million in 1963; sixty per cent of the registrations in 1963 were in Ontario and Quebec.

The anti-freeze preparations are dealt with in the section of the report on heading 38.19, but it might be noted here that some producers of anti-freeze complained that they were at a serious disadvantage in competing with the two integrated companies because they were either dependent upon the two glycol manufacturers for the ethylene glycol, or must import it over a duty of 10 per cent. Ethylene glycol is by far the principal element of cost in the production of the anti-freeze preparations.

(1) Transcript, Vol. 54, p. 8192

(2) Same, Vol. 106, p. 16070

(3) Same, Vol. 144, p. 21467

Consumption of Ethylene Glycol by Specified
Industries, 1961 and 1962

<u>Industry</u>	<u>1961</u>		<u>1962</u>	
	<u>'000 lb.</u>	<u>\$'000</u>	<u>'000 lb.</u>	<u>\$'000</u>
Industrial Chemicals	109	15	148	21
Paints and Varnish	796	130	963	176
Primary Plastics and Synthetic Resins	5,782	862	6,353	865
Other Chemical Industries(a)	<u>95,000</u>	<u>12,300</u>	<u>97,000</u>	<u>12,600</u>
Total(a)	102,000	13,300	105,000	13,600

(a) Includes an estimate for anti-freeze use; value data derived by pricing quantity at 13 cents per pound

Source: D.B.S., various publications, together with an estimate for anti-freeze use

In the manufacture of explosives, ethylene glycol is, within limits, substitutable for glycerine and is incorporated into explosives destined for use in extreme cold. Approximately 10 per cent of the ethylene glycol consumption in Canada was estimated to be for this use.⁽¹⁾ The above table indicates that about 5 per cent is sold to producers of primary plastics and resins which ultimately become synthetic fibres and films. In addition, however, synthetic resins produced by the two manufacturers of ethylene glycol could account for additional quantities of ethylene glycol. Relatively minor amounts are used in paints and varnish, the moistening of tobacco, preserving the flexibility of leather, finishing and dyeing textiles and in electrolytic condensers.

Based on D.B.S. data and the anti-freeze estimate by Laurentide Chemicals, total domestic consumption of ethylene glycol in 1962 would be between 100 and 110 million pounds; this estimate, however, likely understates somewhat total use in Canada. Moreover, as noted below, there has been at times, a significant export market for ethylene glycol. The demand for anti-freeze purposes, following the trend of motor vehicle registrations, probably increased about 5 per cent annually in 1963 and 1964. Canadian capacity and production, however, are more than adequate to meet Canadian requirements, though there were significant quantities of both imports and exports in each year. Data on imports are given in the following table; there are no published statistics on Canada's exports, but it is known that in many years there are significant exports. One of the companies noted that there had been considerable exports to the United Kingdom from 1957 to 1960. In 1959 and 1960, these were caused, at least in part, by the destruction of a large plant in the U.K.; in the earlier years there were shortages in the United Kingdom. On some occasions, when Canadian material was being shipped to the United Kingdom, roughly corresponding amounts were being imported from the United States to meet Canadian requirements. Dow Chemical reported that, with respect to its participation in this trade, pure ethylene glycol was exported and blends were

(1) Transcript, Vol. 106, p. 16070

imported into Canada from the parent company in the U.S.A. This trade was encouraged by the British tariff preference for Commonwealth material. Some imports into Canada reflect regional market considerations and some were said to occur because of the believed superiority of the foreign product:

"In the relatively small uses, in the use of electrolytic condensers where you have to have virtually a zero iron content, people will import from the United States because they feel they will not get what they require in Canada..."(1)

During the past 10 years, all imports of ethylene glycol to Canada have come from the United States except in 1959, when about 7000 pounds were imported from the United Kingdom and 4.3 million pounds from Puerto Rico, and 1960, when about 8.5 million pounds came from Puerto Rico. In recent years, except for 1964, imports have been a small part of total Canadian use.

Imports of Ethylene Glycol to Canada
1953-1964

<u>Year</u>	<u>For Use in</u> <u>Anti-freeze</u> <u>Compounds</u>	<u>For Use in</u> <u>Explosives</u>	<u>For Other</u> <u>Uses</u>	<u>Total</u>		<u>Unit</u> <u>Value</u>
	- Thousands of Pounds -	- Thousands of Pounds -	- Thousands of Pounds -	'000 lb.	\$'000	¢/lb.
1953	19,622	668	847	21,137	3,090	14.6
1954	7,803	162	400	8,365	933	11.2
1955	7,529	75	145	7,749	927	12.0
1956	2	74	135	211	38	18.0
1957	13,214	-	50	13,264	1,443	10.9
1958	3,097	-	2,400	5,497	652	11.9
1959	24,128	10	9,476	33,614	3,417	10.2
1960	7,534	-	8,592	16,126	1,764	10.9
1961	1,046	74	141	1,261	142	11.3
1962	2,150	919	1,226	4,295	489	11.4
1963	2,317	-	66	2,383	271	11.4
1964	..	..	..	23,923	2,959	12.4

Source: D.B.S., Trade of Canada, Imports, s.c. 8399 and 8400. Some glycol mixtures might be included in the anti-freeze column

Except for the unusually large value of imports from Puerto Rico in 1960, all imports have been from the U.S.A. and have been dutiable. In 1963, by far the largest amount of the imports was entered into Ontario, though in 1964 most were entered into Quebec. Prior to 1964, most imports apparently were for use in the manufacture of anti-freeze and entered under tariff item 207c, at 10 p.c. duty. The small amounts for various other purposes might have been entered under a number of tariff items, hence the fluctuation in average rates of duty. In any event, nearly all imports were dutiable in the years 1960 to 1963, suggesting that no significant amounts of ethylene glycol were entered duty-free for the manufacture of explosives (item 207b) or for the manufacture of synthetic resins (item 923). The following table illustrates this situation.

Prices and Pricing Policy

Union Carbide Canada Limited stated its pricing policy in these words:

"Faced with varying rates of duty on a given product the manufacturer is given two choices on pricing policy. If one use is duty free he must price all other users on a duty free basis or have different prices depending on the end-use involved. Because of the depressed condition of the ethylene glycol market in the U.S. at the present time, we are pursuing the latter course. This multiple price practice causes one industry to subsidize another. We believe that subsidies are sometimes necessary when a large essential element of the economy is depressed. For instance our farmers are subsidized by taxes from all manufacturing and service industries in Canada. We do not believe however, that it is reasonable or fair to ask other users of ethylene glycol and/or the petrochemical industry to subsidize the explosives industry."(1)

Stated in another way, this policy means that, if there is no duty on imports of ethylene glycol for a specific end-use, the price is comparable to that in the United States but, where a duty does apply, the Canadian price is higher than that in the U.S.A.

The price of ethylene glycol in Canada fluctuated considerably in earlier years, but appears to have been more stable in the past five years. At least in some years the price of the anti-freeze blend has been a cent or more per pound below the price of the technical grade. Price information is difficult to assess because the different uses require different grades, and because of bulk purchasing arrangements. With respect to glycol for the manufacture of anti-freeze preparations, in addition to contract, bulk purchase arrangements, the glycol may be a blend in which other glycols have not been entirely separated from mono-ethylene glycol. The Board was informed that the price of blends of the glycol isomers, sold for anti-freeze compounds, was lower than that for mono-ethylene glycol alone.

The Board's study of ethylene glycol and anti-freeze preparations in 1954, (Reference No. 114) indicated a decline in the price of the ethylene glycol anti-freeze blends from about 19 or 20 cents a pound in 1949 and 1951 to about 10 or 12 cents a pound in 1954-55. Over that period the technical grade declined somewhat less, from 19 or 20 cents to about 15 cents per pound.

By 1959, the price of ethylene glycol for anti-freeze use was reported to be 13.75 cents per pound which appears to have been about the same as the U.S. price for technical grade ethylene glycol. The price, at the time of the hearing in 1961, was reported to vary from \$0.134 to \$0.155 per pound, full freight allowed to all destinations in tank cars or tank trucks. The published U.S. price of technical grade at that time was \$0.135 per pound.

(1) Transcript, Vol. 106, p. 16090

The table which follows on published prices in Canada and the United States does not illustrate the different prices for different purposes. Moreover, prices vary with quantity, and many sales are made on contract. The various arrangements have the effect of materially reducing the realized price below the levels shown in the table.

Prices of Ethylene Glycol, Canada
and U.S.A., 1959-1965

<u>Year</u>	<u>Canada</u>		<u>U.S.A.</u>	
	(a)	(b)	\$U.S.	\$Can.
	\$ per pound		per pound	
1959	0.1375		0.135	0.129
1960	0.1375		0.135	0.131
1961	0.1350	0.155	0.135	0.137
1962	0.1310	0.155	0.135	0.144
1963	..	0.155	0.135	0.146
1964	..	0.165	0.135	0.146
1965 (April)	..	0.165	0.135	0.146

Source: U.S. prices: Oil, Paint and Drug Reporter; technical grade, tank cars, freight allowed, converted to Canadian prices at annual average noon rate of exchange
Canadian prices: (a) Transcript, Vol. 144, p. 21465; reported low prices used in 1961 and 1962; (b) Canadian Chemical Processing, tank car lots

Tariff Considerations

Three items in the existing Customs Tariff provide for ethylene glycol by name. They are:

<u>Tariff Item</u>	<u>Description</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
207b	Ethylene glycol, for use in the manufacture of explosives.....	Free	Free
207c	Ethylene glycol, and mixtures of ethylene glycol and other glycols in which ethylene glycol predominates, for use in the manufacture of anti-freezing compounds.....	10 p.c.	10 p.c.
923	Phthalic anhydride, adipic, abietic, maleic and succinic acids, hexamethylene diammonium adipate, hexamethylene diammonium sebecate, hexamethylene diamine, caprolactam, and <u>ethylene glycol</u> , when imported by manufacturers of synthetic resins, for use exclusively in the manufacture of synthetic resins, in their own factories.....	Free	Free

When for other uses, ethylene glycol is imported under tariff item 711, at rates of 15 p.c., B.P., 20 p.c., M.F.N. Mixtures would be entered at the same rates of duty under tariff item 220a. The three items which provide for the named end-uses were said to consume about 90 per cent of all the ethylene glycol used in Canada.⁽¹⁾ As indicated in the table on imports, before 1964 item 207c had apparently accounted for most of the ethylene glycol brought into the country from abroad. The substantial imports of 1964, all from the U.S.A., were almost all dutiable at 20 p.c., indicating entry probably under tariff item 711.

The following companies made representations before the Board; the first two are manufacturers, consumers and suppliers of ethylene glycol, and the remainder are consumers:

- 1) Dow Chemical of Canada Limited, Sarnia, Ontario
- 2) Union Carbide Canada Limited, Montreal, Quebec
- 3) Laurentide Chemicals Inc., Shawinigan, Quebec
- 4) Radio Oil Refineries Limited, Winnipeg, Manitoba
- 5) Canadian Industries Limited, Montreal, Quebec

Dow Chemical and Union Carbide, as manufacturers, requested that duties of 15 p.c., B.P. and 20 p.c., M.F.N. should apply to ethylene glycol. Dow Chemical requested that end-use tariff items 207b and 207c be abolished. The company estimated that over 90 per cent of its production goes into applications where the end-use provisions apply; for the principal use, a duty of 10 per cent applies. Union Carbide made a similar statement and, in recommending that the end-use provision under tariff item 207b be removed, said that the suggested duty should apply "for all uses."⁽²⁾

Radio Oil Refineries and Laurentide Chemicals proposed that ethylene glycol for use in making anti-freezing compounds should be allowed duty-free entry into Canada.⁽³⁾ Laurentide wished to retain "the definition of tariff item 207c."⁽⁴⁾

Union Carbide noted that it is in Canada's interest to assure a healthy petrochemical industry. The company referred to the large excess of capacity in the United States that was expected to persist until about 1967.⁽⁵⁾

Dow Chemical also expressed concern about the large over-capacity in the U.S.A.⁽⁶⁾ This situation typically is accompanied by declining prices in the United States, against which Canadian producers feel that they require the protection afforded by increased customs duties. Because much of the ethylene glycol capacity exists in the Gulf of Mexico region of the U.S.A., it can reach the major Canadian markets by water at low freight rates, so that this additional cost was represented by the Canadian producers as not being a major deterrent to the foreign product.

(1) Transcript, Vol. 48, p. 7206

(2) Same, Vol. 106, p. 16069

(3) Same, Vol. 48, p. 7226; Vol. 144, p. 21460; Vol. 145, p. 21686

(4) Same, Vol. 144, p. 21460

(5) Same, Vol. 106, p. 16068; Vol. 118, p. 17732

(6) Same, Vol. 119, p. 17945

The spokesman for Union Carbide stated that the effect of lowering the rate of duty on ethylene glycol, "to the extent that it makes available to this country ethylene glycol from the United States or Japan at lower prices" would be to require Canadian producers to lower their prices, thereby producing a return on investment which is "less than minimal" and resulting in the danger of the plant's becoming uneconomic.⁽¹⁾ The company contended that the return on its investment is already small and that the penalty of forcing prices to lower levels might be tighter integration within the industry; the producers of ethylene glycol might become the sole producers of anti-freezing compounds, to the detriment of those companies at present making and canning anti-freeze. Dow Chemical noted that ethylene glycol is just one of its several products, and that all products taken together must return a profit to the company, and suggested that rates of duty of 15 p.c., B.P., 20 p.c., M.F.N. should apply generally to chemicals.

Laurentide Chemicals and Radio Oil Refineries argued that tariff protection should be abolished on the grounds that the ethylene glycol producers have abused the privilege granted by the current duties, by using them to "squeeze the canners out of business."⁽²⁾ Although this situation is dealt with under anti-freeze preparations of heading 38.19, where the full commercial situation can better be outlined, the broad significance of it is well to note here.

The relationship between ethylene glycol and anti-freeze preparations was the issue of greatest importance concerning proposals for ethylene glycol. Anti-freeze preparations are, by far, the largest single outlet for ethylene glycol; free entry or particular rates of duty that encompass ethylene glycol for this use will have the major impact on Canadian producers of glycol and on the principal market for the product. On the other hand, it is worth noting that the substantial imports of 1964 were made over a duty of 20 per cent, the rate proposed by the producers. Any duty on ethylene glycol places the unintegrated manufacturers of anti-freeze in a more vulnerable position than would free entry, relative to the two Canadian producers of glycol who also manufacture anti-freeze on a very large scale. The cost of glycol is so large a part of the cost of manufacture of anti-freeze preparations and competition is so keen in the sale of anti-freeze that the reduction of the margin between cost of glycol and selling price of anti-freeze could be sufficient to eliminate the unintegrated producers. There is some evidence that the margin between the market price of ethylene glycol and that of anti-freeze had narrowed during the years immediately preceding the public hearing. Furthermore, whereas at the time of the Board's hearing in 1954 there were reported to be some twelve independent canners, at the time of the hearing in 1962 there were reported to be only three. Many of the others had entered into contractual arrangements with the glycol producers. The unintegrated producers clearly regarded the free entry of ethylene glycol as a matter of very great importance to them in their relationships with the integrated producers, not because they necessarily would import their requirements of ethylene glycol, but because they would be in a position to negotiate purchases from the Canadian producers of glycol at prices that took account of the duty-free provision.

(1) Transcript, Vol. 145, p. 21672

(2) Same, Vol. 144, p. 21483

What is by no means clear in this situation is what effect free-entry or the proposed rate of 20 p.c., M.F.N. would, in fact, have, nor, for that matter, what effect the existing rate of 10 p.c. has. It is not clear that free entry would enable unintegrated producers to withstand the competitive pressures that the integrated companies might bring to bear though, of course, free entry would place them in a better position to do so than would a duty of 10 p.c. or 20 p.c. It is not at all clear that the producers of ethylene glycol require the protection of a duty of 20 p.c. on glycol in order to maintain economic production in Canada. On the contrary, they have maintained and expanded production with a duty of 10 p.c. through years in which they were said to face considerable over-capacity in the U.S.A. and throughout many years when the exchange premium on the Canadian dollar almost completely offset the rate of duty. Throughout these years imports were negligible except for those made by the producers themselves and, as in 1964, made over the very rate of duty which the producers proposed. On the other hand, the integrated producers could expect that their competitive position and, presumably, profit position would be enhanced by the duty of 20 p.c. which they proposed for ethylene glycol, whether or not it resulted in the elimination of unintegrated producers.

Canadian Industries Limited noted that the company is a substantial user of ethylene glycol for explosives and that the uses to which it is put are covered by end-use items. However, in justifying its proposal for duties of 15 p.c., B.P. and 20 p.c., M.F.N. on explosives, Canadian Industries Limited noted that the Board's acceptance of proposals for ethylene glycol would increase the duty on some of the raw materials for nitroglycerin manufacture. The company further said "we don't propose to make any suggestion that duties on these items [materials] be eliminated."(1)

The above statement was made at the hearing on explosives in November 1962. No further representations were made concerning the use of ethylene glycol for explosives or the end-use item relevant thereto, or concerning its use in the manufacture of synthetic resins or the end-use provision for ethylene glycol in item 923. At the hearing on tariff item 923, Dow Chemical had placed on the record a statement in which it reiterated its request that "ethylene glycol be removed from Tariff Item 923 and be classified under B.N. 29.04."(2) In a more general submission at the same hearing, Union Carbide recommended the elimination of all end-use items. Further, at the hearing on explosives, Union Carbide pointed out that free entry under end-use tariff item 207b had been established 22 years before ethylene glycol was produced in Canada and that it continues even though the product has been made in Canada for a number of years. As noted above, the company requested the removal of this provision. Dow Chemical, at the same hearing, suggested that the lack of imports under tariff item 207b did not indicate "that the existence of the tariff item has not been a hardship to domestic producers" but rather that "domestic producers have been successful in retaining the Canadian market, probably by meeting prices offered by foreign producers."(3)

(1) Transcript, Vol. 106, p. 16026

(2) Same, Vol. 174, p. 28575

(3) Same, Vol. 106, p. 16100

No other reasons were advanced for the proposed rates of 15 p.c., B.P., 20 p.c., M.F.N., specifically for ethylene glycol, and in particular for the proposed rate of 15 per cent under the British Preferential Tariff; these were the rates generally proposed for chemicals.

The Board has not all of the information necessary to assess fully any differences there might be in costs of production in Canada and the U.S.A., differences in freight costs for the domestic supplier and imported ethylene glycol, or the effect of these factors on the pricing policy and, hence, on the profits of the two producers of ethylene glycol in Canada. Prices of ethylene glycol in Canada do not seem to have been subjected to severe external pressure in recent years; available information on imports indicates that they have supplied a very small part of total Canadian use and, in some years, have been exceeded by exports. Increases in installed capacity and in production, shared by the two producers of ethylene glycol in Canada, do not suggest an increase in any hardship which the producers might have felt under the existing rates of duty, indicative of the need for the proposed increase in protection in order to supply essentially all of the Canadian market from Canadian production.

Propylene Glycol

Propylene glycol is a clear, colourless non-toxic liquid. It is made by the oxidation of hydrocarbon feedstock to propylene oxide which, in turn, is mixed under pressure with water to form propylene glycol. This is the same oxidation process that results in formaldehyde, acetone and finally in alcohols. Produced by Canadian Chemical Company Limited at Edmonton, Alberta, it is used as a solvent for dyes, essential oils, antiseptics, resins and other organic substances.

At the time of the hearing in 1961, Dow Chemical of Canada Limited was expected shortly to become a producer of this chemical. Canadian Chemical Company noted that the amount of propylene glycol that can be produced is limited by the volume of propylene oxide yielded by the initial oxidation of the hydrocarbon feedstock. The spokesman mentioned the possibility of new uses for the glycol and expressed doubt that Canadian Chemical Company alone would be able to meet the demand for it. It was felt that Dow Chemical would be able to help fill the void.⁽¹⁾ The new use which was spoken of was probably for the manufacture of polypropylene by Dow Chemical. As will be apparent in the part of this report dealing with this plastic material under Chapter 39, polypropylene was not made in Canada in 1964, although a physical plant apparently existed which is capable of making it alternatively to high density polyethylene.

Regarding uses, Canadian Chemical Company reported that: "Sales in 1960 were divided fairly evenly between U.S.P. grade and technical grade. Approximately one-third of the U.S.P. grade was used as a humectant in the manufacture of tobacco. The remainder was utilized in a miscellaneous range of uses in the food, pharmaceutical and cosmetics industry ... The technical grade was very largely used in the production of polyester resins ... well over 90 per cent of this volume went to Ontario and Quebec."⁽²⁾

⁽¹⁾ Transcript, Vol. 48, p. 7253

⁽²⁾ Same, Vol. 48, p. 7251

The published delivered price of the technical grade in Canada has been $14\frac{1}{4}$ cents per pound since mid-1962; prior to that time it generally was $13\frac{1}{2}$ cents per pound. In the United States the corresponding price has been $12\frac{1}{2}$ cents per pound since 1959. The price of U.S.P. grade material is about 2 cents per pound higher.

This chemical has not been exported from Canada.⁽¹⁾ Imports are shown in the following table; quantities are calculated from the Canadian published prices for each year. It was the impression of the spokesman for Canadian Chemical Company that imports account for a small part of the total market.

Imports of Propylene Glycol, 1959-1963

<u>Year</u>	<u>\$'000</u>	<u>'000 pounds</u>
1959	120	800
1960	190	1,408
1961	200	1,481
1962	105	724
1963	70	483

Source: Dept. of Trade & Commerce, Chemical Import Trends

Propylene glycol is imported into Canada under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. Canadian Chemical Company Limited made the only presentation before the Board, but Dow Chemical of Canada Limited advised the Board by letter that it concurred with Canadian Chemical Company's brief.⁽²⁾ Both companies are, therefore, in favour of the rates of duty remaining unchanged. No representation was made as to why these rates are appropriate specifically for propylene glycol; they are the rates which were proposed generally by the industry for chemicals.

Propylene glycol, under the name propane-1:2-diol, was included in a list of chemicals for which the Canadian Pharmaceutical Manufacturers Association requested an end-use item, as noted later in this section of the report under "Other Representations."

Hexylene Glycol

At the time of the hearing in 1961 hexylene glycol was not produced in Canada, but was expected to be made within a year by B.A.-Shawinigan Limited.⁽³⁾ The company is understood to have begun manufacture, and a "Made in Canada" ruling has been issued for hexylene glycol. It is made by the hydrogenation of diacetone alcohol, in turn made by the aldol condensation of acetone which is a principal product of Shawinigan's complex. It is used in hydraulic fluids, textile oils, inks and as a moistening agent for cork, paper, cellophane, leather and textile fibres.

(1) Transcript, Vol. 48, p. 7251

(2) Same, Vol. 48, p. 7259

(3) Same, Vol. 47, p. 7052

Before Canadian production began, the Canadian demand was satisfied from imports, practically all from the United States. The value of imports has been reported as follows:

Imports of Hexylene Glycol, 1959-1963

<u>Year</u>	<u>\$'000</u>	<u>'000 pounds^(a)</u>
1959	145	906
1960	155	969
1961	220	1,375
1962	575	3,287
1963	960	5,647

(a) Quantity calculated on the basis of an annual price per pound

Source: Dept. of Trade & Commerce, Chemical Import Trends

Since mid-1961, the Canadian published price has been variously 17 or 17½ cents per pound in tank car quantities, freight allowed; prior to that time it was 16 cents per pound. The published price in the U.S.A. has been 15 cents per pound since 1958, tank car quantities, delivered. The spokesman for Shawinigan Chemicals said that the laid-down price in Canada, duty paid, "is 17 cents a pound."⁽¹⁾

Hexylene glycol, at the time of the hearing, was being imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. B.A.-Shawinigan Limited, the only company making a representation to the Board on this chemical, proposed rates of 15 p.c., B.P. and 20 p.c., M.F.N. It was the company's expectation that a made in Canada ruling would be in effect "before the Board's report is completed."⁽²⁾ The product is now ruled made in Canada, dutiable at 15 p.c., B.P., 20 p.c., M.F.N., under tariff item 711. These rates were said to be necessary to encourage Canadian production, though no evidence was presented to indicate why this was so.

III - Polyhydric Alcohols

The third principal class of acyclic alcohols is the polyhydric group, consisting of:

- (1) pentaerythritol
- (2) trimethylol ethane
- (3) 2-methyl-2n propyl-1, 3 propanediol
- (4) mannitol
- (5) sorbitol

These are dealt with in sequence on the following pages, and are followed by formaldehyde sodium bisulphite, classified in B.T.N. 29.04 as a sulphonated derivative of an alcohol.

⁽¹⁾ Transcript, Vol. 47, p. 7046

⁽²⁾ Same, Vol. 47, p. 7052

Pentaerythritol

Pentaerythritol is a white, odourless, sweet-tasting, crystalline solid alcohol with a formula of $C(CH_2OH)_4$. With four hydroxyl groups, it is classified as a "tetrahydric alcohol." It is a highly stable compound, slightly soluble in water, and melts at 260 degrees Centigrade.

Three grades of pentaerythritol are commercially available:

- (a) Pure - essentially 100 per cent monopentaerythritol.
- (b) Technical - containing 85 to 90 per cent of monopentaerythritol and ten to fifteen per cent related polyhydric alcohols, such as dipentaerythritol and tripentaerythritol;
- (c) Nitration - differing particularly in particle size.(1)

Although, for classification under B.T.N. heading 29.04, a product must be a separate chemically defined compound, some amount of impurities which occur as part of a natural mixture is permitted, particularly when these are isomers of the single compound. The companies coming before the Board expressed the view that the technical grade, containing the related alcohols, should be classified in an item worded like heading 29.04 of the B.T.N. Some of the blends likely would be dutiable as mixtures in an item like heading 38.19; the producers proposed the same rates of duty for the mixtures as for the product classified under 29.04.

Pentaerythritol is usually prepared by combining an excess of formaldehyde with acetaldehyde in an aqueous solution of calcium (or sodium) hydroxide in a rather complex process. There are two Canadian producers, Canadian Chemical Company Limited (now part of Chemcell (1963) Limited) at Edmonton, Alberta and Shawinigan Chemicals Limited, at Varennes, Quebec.

Canadian Chemical Company obtains its raw materials, formaldehyde and acetaldehyde, by processing natural gas, making pentaerythritol partly as a means of disposing of formaldehyde. The company is said to be a very efficient, low cost producer.(2) Shawinigan Chemicals originally obtained its acetaldehyde from Shawinigan, Quebec but, since 1963, its Varennes plant has provided this raw material by processing petrochemical feedstocks from a Montreal East refinery. This company makes its formaldehyde from methanol either imported by tanker or purchased from Canadian Chemical Company Limited, the other producer of pentaerythritol.(3)

Estimates of capacity and production are not publicly available. A press report favourably compared the capacity of Canadian Chemical Company Limited with that of the largest producer in the U.S.A. at 28 million pounds per year.(4) During the hearing on formaldehyde, the representative of Shawinigan Chemicals said that the company's original capacity of 3 million pounds of pentaerythritol had

(1) Transcript, Vol. 48, p. 7261; Vol. 49, p. 7287

(2) Same, Vol. 48, p. 7276-7

(3) Same, Vol. 56, p. 8506, 8511-2

(4) Oil, Paint and Drug Reporter, Sept. 2, 1963, p. 27

been raised "considerably ... by bits and pieces to remove bottle-necks ..." (1) The spokesman noted that the Canadian Chemicals' plant was several times larger than that of Shawinigan Chemicals and that either company alone could supply the Canadian market. (2)

There is no captive use of pentaerythritol at either Canadian plant; the product is sold in both domestic and export markets. The manufacture of pentaerythritol was described by Canadian Chemical Company as a way of disposing of excess formaldehyde.

Pentaerythritol was said to be used principally in the manufacture of alkyd resins for plastics, surface coatings and special fire retardant paints. Most sales are believed to be of the pure grade which is sold at the same price as the technical grade. A small proportion, the nitration grade, enters the explosive industry when nitrated to become pentaerythritol tetranitrate for combination with trinitrotoluene (TNT) particularly for initiating devices.

Alkyd resins were said to account for about 95 per cent of the use of pentaerythritol in Canada, with a rapid increase in the use resulting as the product largely replaced glycerol in "long oil" alkyd resins in high quality protective coatings. (3)

Published data on pentaerythritol used by the paint industry and by the plastics industry are given in the following table; these would account for most of the Canadian consumption. In 1963, it will be noted these two uses took 5.9 million pounds; other reported consumption was only about one-half million pounds. Thus, export sales must be maintained in very much greater quantity than domestic sales to warrant the available capacity which, at least for the larger plant, that of Canadian Chemical, was said to be fully utilized at the time of the hearing, and for which export sales were said to be a considerable multiple of domestic sales.

Consumption of Pentaerythritol by Industry
1959-1963

	<u>Paint and Varnish</u> <u>Industry</u>		<u>Primary Plastics</u>		<u>Total</u> <u>Paint & Plastic</u>	
	'000 lb.	\$'000	'000 lb.	\$'000	'000 lb.	\$'000
1959	2,888	874	1,542	454	4,430	1,328
1961	3,182	949	1,486	431	4,668	1,380
1962	3,437	991	1,547	434	4,984	1,425
1963	3,952	1,072	1,900	532	5,852	1,604

Source: D.B.S. Cat. Nos. 46-210, 46-211

(1) Transcript, Vol. 56, p. 8516-7

(2) Same, Vol. 49, p. 7287, 7311

(3) Same, Vol. 48, p. 7270

It will be noted in the table that in 1962 the 5 million pounds of pentaerythritol used by these two industries were valued at more than \$1.4 million, an average value of about 28½ cents a pound.

Ninety per cent of domestic sales were said to be in Ontario and Quebec. From Edmonton to the market in Central Canada the product was reported to bear a freight cost of \$2.18 per hundred pounds, car-load lots, in 50-pound, multiwall paper bags.

Glycerine and trimethylol ethane compete to some extent with pentaerythritol, but because of the latter's lower price, neither substitute occupies a large share of the market. Alkyd resins were made from glycerine before the economic introduction of pentaerythritol, and glycerine's price and substitutability are factors in determining pentaerythritol's price. Trimethylol ethane's substitutability in alkyd resins is apparently limited to a narrow range of surface coatings, especially finishes for automobiles and electrical appliances.

Imports were reported to be negligible, with the price in Canada said to be usually below the U.S. price. The spokesman for Canadian Chemical Company noted that pentaerythritol is a very important item in the company's export programme, the material being sold to more than 30 countries in 1960 in a quantity far in excess of Canadian sales. The company's affiliate in the United States, Celanese Chemical Company, has been a major importer and reseller of the Canadian product, apparently importing about 10 million pounds in 1964. Growth in Canadian demand and new opportunities in world markets are reported to be factors in the U.S. company's plans to produce pentaerythritol in the United States.(1) At the time of the hearing, the anticipated increases in the external tariff of the European Common Market were a matter of concern to the company.

Prices of pentaerythritol reflect changes in the world price of glycerine, potentially a competitive product. Moreover, to compete in export markets, Canadian-made pentaerythritol is priced with a view to prices at which other countries offer it. In 1961, at the time of the hearing, the price in both Canada and the United States had declined slightly, to 29 cents per pound from the earlier level of 29½ cents in Canada and 31 cents in the U.S.A., for the technical grade. By mid-1964, however, the Canadian published price was higher, at 28 cents per pound, than that in the U.S.A., at 26 cents per pound. Prices in both countries are for delivered pentaerythritol but are not converted to a common currency.

Tariff Considerations

Pentaerythritol normally would be entered into Canada under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. The nitration grade was, at the time of the hearing, not considered made in Canada and was therefore dutiable under tariff item 208t, Free, B.P. and 15 p.c., M.F.N.; all grades are now ruled made in Canada and dutiable under item 711.

(1) Oil, Paint and Drug Reporter, February 8, 1965, p. 37

Canadian Chemical Company Limited and Shawinigan Chemicals Limited, as producers of pentaerythritol, proposed rates of 15 p.c., B.P. and 20 p.c., M.F.N. There was some discussion about the nitration grade of pentaerythritol being classed as a chemical not made in Canada and admissible Free, B.P. under tariff item 208t. The nitration grade was said to differ from the pure product only in the size of the particles and can be used in place of other grades; hence it was represented to be possible to import nitration grade under item 208t and avoid the rates of duty under item 711. However, imports under either item were said to be negligible at the time of the hearing in 1961.

Both producers opposed the continuation of free entry for competitive trimethylol ethane under item 921; this chemical is a substitute for pentaerythritol in some uses.

Shawinigan Chemicals was also concerned that the existing free entry of methanol under temporary item 158(a) might come to an end. Methanol is used for the production of formaldehyde, in turn used to make pentaerythritol. The company anticipated that it might be placed at a disadvantage in supplying pentaerythritol if a duty were applied on methanol.

Trimethylol Ethane

The Canadian Paint Varnish and Lacquer Association submitted a proposal on trimethylol ethane used by three of its members in the manufacture of alkyd resins. The Association maintained that it "possesses or confers certain characteristics which render it advantageous to use in some formulations for industrial-type finishes (e.g. automotive finishes or appliance enamels)."(1) Because of these characteristics it was said to be superior in some applications to pentaerythritol. The spokesman for Canadian Chemical Company Limited contested this claim, however, saying that pentaerythritol and trimethylol ethane are more completely interchangeable than the Association's brief would indicate. Prices of the two products are similar, at about 30 cents per pound, although pentaerythritol is $\frac{1}{2}$ cent to 1 cent lower.

Trimethylol ethane is not made in Canada and is imported free of duty under tariff item 921 for use in the manufacture of synthetic resins, or item 208t, at rates of Free, B.P. and 15 p.c., M.F.N. for general use. The Canadian Paint Varnish and Lacquer Association recommended that imports should be entered into Canada free of duty until it is made here. When it is made in Canada, the Association suggested that the same rates, 15 p.c., B.P. and 20 p.c., M.F.N. should apply as those requested for pentaerythritol. Both Canadian Chemical Company Limited and Shawinigan Chemicals Limited opposed the Association's proposal, recommending rates of 15 p.c., B.P. and 20 p.c., M.F.N., the former saying "very slight differences in performance of surface coatings ought not to give rise to exceptions in this field."(2)

(1) Transcript, Vol. 49, p. 7313

(2) Same, Vol. 49, p. 7328

2 Methyl - 2n-propyl-1,3-propanediol

This chemical is made in Canada by Fine Chemicals of Canada Limited whose plant has an annual capacity of some 220,000 pounds. It is an intermediate used in the manufacture of meproamate, a tranquilizer drug. It is entered into Canada under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. and the company requested that no reduction be made in these rates.⁽¹⁾

Sorbitol and Mannitol

Sorbitol and mannitol are alcohols. They are isomers, one of the other, made by the hydrogenation of cane, corn or beet sugar. At the time of the hearing in 1961 they were not made in Canada but production of sorbitol was started in 1962 by Atlas Powder Company, Canada, Ltd.

Although these two isomers are identical except for a minor difference in the configuration of the molecule, and are manufactured as co-products, they possess different properties which make them suitable for different uses. In particular, sorbitol derives its value from the fact that it is hygroscopic, whereas mannitol derives its value from its non-hygroscopic nature. Sorbitol is manufactured and sold in either crystalline or solution form; mannitol is sold as a powder.

Sorbitol is used to improve the body, taste and feel of such pharmaceutical products as toothpaste, food and beverages; it prevents crystallization of candy; it prevents tobacco from drying out, and it serves as a raw material for alkyd resins and surface-active agents. In some of these uses it is said to be competitive with glycerine.

The principal use for mannitol is in pharmaceuticals where it is used as a tableting base. It has another large use in electrolytic condensers and is used in food to supply body and texture.

Imports of sorbitol were valued at from about \$300,000 to \$500,000 between 1959 and 1962 and \$100,000 in 1963. Later data are not publicly available, nor are data on mannitol. The published price of a 70 per cent solution of sorbitol in the U.S.A., toward the end of 1964, was 16 cents per pound; it has varied within a range of from 15 cents to 16½ cents per pound over the past 12 years.

Sorbitol and mannitol, at the time of the hearing, were entered into Canada under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. Sorbitol solutions are now ruled made in Canada, dutiable at 15 p.c., B.P., 20 p.c., M.F.N. under item 711. Atlas Powder Company (Canada) Limited requested duty-free entry under both Tariffs, but requested an automatic provision to increase these rates to 15 p.c., B.P. and 20 p.c., M.F.N., "when production facilities are available in Canada to supply the requirements of our country."⁽²⁾

(1) Transcript, Vol. 48, p. 7259

(2) Same, Vol. 49, p. 7336

The spokesman for Lever Brothers disagreed with Atlas Powder's request for duty-free importation of sorbitol because of its competitive use partly at least as a raw material in the manufacture of surface-active agents competitive with those in which Lever Brothers has an interest as a producer.

The Canadian Paint Varnish and Lacquer Association noted that two of its member companies use sorbitol in the production of alkyd resin. For this purpose it is allowed to enter Canada free of duty under tariff item 921. The Association recommended that this product be accorded duty-free entry until it is made in Canada,⁽¹⁾ at which time rates of 15 p.c., B.P., 20 p.c., M.F.N. might apply.

Mannitol was mentioned by Ferro Enamels (Canada) Limited in a submission at the public hearing of May 22, 1963. The product was said to be one of a number of chemicals used by the company in very small quantities in stabilizers for vinyl type resins "to prevent deterioration due to the effects of heat and light, which shows up as a discolouration during processing or in the plastic products."⁽²⁾ The company proposed free entry under the B.P. and M.F.N. Tariffs for such products until made in Canada, at which time the rates of duty would be 15 p.c., B.P., 20 p.c., M.F.N., under the company's proposal.

Mannitol and sorbitol were also included in a list of products in which the Canadian Pharmaceutical Manufacturers Association expressed an interest as noted below. No reasons were advanced by any of the parties as to why rates of 15 p.c., B.P., 20 p.c., M.F.N. were appropriate specifically for these products when they are made in Canada.

Formaldehyde Sodium Bisulphite

This chemical is an anhydrous white powder used in the photographic industry. It is not made in Canada but is imported by Charles Albert Smith, Limited from England. It is at present imported into Canada under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. The company recommended that these rates should not be changed until such time as the product is made in Canada.⁽³⁾ The Industry Committee noted that no data had been presented "to indicate that this had sufficient volume or significance to warrant separate treatment ..."⁽⁴⁾

Other Representations on Heading 29.04

No other representations were made on individual products of heading 29.04, but two Associations expressed an interest in groups of products under the heading.

The Canadian Pharmaceutical Manufacturers Association submitted to the Board a list of chemicals used by its members in the manufacture of pharmaceutical products and "strongly recommended that 'some

(1) Transcript, Vol. 49, p. 7392

(2) Same, Vol. 165, p. 24407

(3) Same, Vol. 49, p. 7400

(4) Same, Vol. 49, p. 7399

end-use' treatment be adopted" for these chemicals. It recommended that rates of Free, B.P. and 15 p.c., M.F.N. should apply when the chemicals are not made in Canada and that the heading rates suggested by the Industry Committee (15 p.c., B.P. and 20 p.c., M.F.N.) apply when they are made in Canada. The list of chemicals in this heading to which this proposal applies is as follows:

- acetone sodium bisulphite
- n-butanol
- iso butyl alcohol
- sec butyl alcohol
- tert butyl alcohol
- ceryl alcohol
- cetyl alcohol
- chloral hydrate
- chlorbutol
- ~~4-chlorobutan-1-ol~~
- choline chloride
- n-dodecanol
- ethanediol
- ethchlorvynol
- mannitol
- methanol
- propane-1: 2-diol (propylene glycol)
- n-propanol
- iso propyl alcohol
- sorbitol

Of these, chloral hydrate, choline chloride, mannitol, methanol, isopropyl alcohol and sorbitol were listed as the more important chemicals to members of the Association.

The Toilet Goods Manufacturers Association submitted that end-use provisions in the tariff are "necessary and justified" for goods required by industry as raw materials, particularly when they are not made in Canada. Although tariff item 264(a), under which the essential oils in which members of the Association are especially interested are imported, is not within the terms of Reference 120, there is the possibility that the "n.o.p." provision of this item could result in certain chemicals being classified in items worded like headings of B.T.N. Chapter 29 and excluded from entry under tariff item 264(a) with the resulting loss of the present end-use treatment. The Association recommended that the "n.o.p." provision be removed from tariff item 264(a) or a recommendation of similar intent be made by the Board. The chemicals of the present heading to which this concern applies are:

- citronellol dextro
- geraniol from citronella 2nd
- geraniol from palmarosa
- dimethyl octanol
- linalol from Bois de Rose 2nd
- nerol
- rhodinol AA

At the hearing on pesticides, in November 1962, a group of seven manufacturers of pesticides made a proposal concerning a list of biologically active materials, among them ethylhexanediol, for use in the manufacture of pesticide formulations. The companies were:

A.H. Howard Chemical Co. Ltd.	Orangeville, Ontario
Allied Chemical Services Ltd.	Calgary, Alberta
Chipman Chemicals Ltd.	Hamilton, Ontario
Gallowhur Chemicals Canada Ltd.	Lachine, Quebec
Manchester Products Ltd.	Galt, Ontario
Niagara Brand Chemicals	Burlington, Ontario
Green Cross Division	
Sherwin Williams Co. of Canada Ltd.	Montreal, Quebec

The companies proposed:

"The signatories of this brief share the view of the Chemical Industry Committee that, when a biologically active chemical, now on Appendix II, is made in Canada, it should become subject to the duty rates which have been recommended for the appropriate B.T.N. heading."⁽¹⁾

The producers proposed duty-free entry for the products until they are made in Canada. The proposal was based on the belief that a duty on biologically active materials, not made in Canada, would increase the prices of pesticides to Canadian users without producing off-setting advantages for any segment of industry.

FATTY ALCOHOLS - B.T.N. 15.10

While B.T.N. heading 15.10 refers to "Fatty Acids; Acid Oils from Refining; Fatty Alcohols", this part of the report deals only with fatty alcohols, in the context of the alcohols discussed under heading 29.04. The remainder of the classification is discussed with heading 29.14.

When fatty alcohols occur as single, chemically defined compounds, they are classified in the B.T.N. under heading 29.04. However, the fatty alcohols used in industry are frequently mixtures and these mixtures are classified in heading 15.10. According to the Brussels Explanatory Notes, this heading includes "mixtures of acyclic alcohols obtained by catalytic reduction of the mixed fatty acids of this heading or of their esters, by saponification of sperm oil, by catalytic reaction between olefins, carbon monoxide and hydrogen ("Oxo" process), by hydration of olefins, by oxidation of hydrocarbons, or by other means."⁽²⁾

In the Brussels classification, therefore, fatty alcohols may be derived from animal, vegetable or mineral (petroleum) sources. Two companies, Canada Packers Limited and Procter and Gamble Company of Canada, Limited submitted a joint brief to the Board on this subject and restricted their interest to:

(1) Transcript, Vol. 108, p. 16332

(2) Explanatory Notes to the Brussels Nomenclature, 1955, Vol. 1

"Fatty alcohol blends derived from vegetable and/or animal fats and oils containing some or all of the following alcohols as active ingredients:

lauryl alcohol	(dodecanol)
myristic alcohol	(tetradecanol)
cetyl alcohol	(hexadecanol)
stearyl alcohol	(octadecanol)"(1)

As the names in bracket indicate, these alcohols are in the C₁₂ to C₁₈ group.

The spokesman for the companies elaborated the idea of the mixture in saying: "We have talked about these materials as blends containing a group of four chemicals. In actual commercial practice there are two dominant groups; those largely derived from coconut oil containing the lauryl and myristic alcohols predominantly, and those derived from tallow or similar material which contains predominantly the cetyl and stearyl alcohol."(2) A further product, oleyl alcohol, derived from natural fats and oils was listed also as being used in surfactants.

These were the only fatty alcohols brought to the attention of the Board. The Industry Committee noted that, in its belief, all alcohols of heading 15.10 which currently have commercial significance were dealt with in the submissions which the Board had received for this hearing.

Fatty alcohols are used in Canada in the manufacture of detergents that reach a retail market in such products as shampoos and household detergent for laundry, dish-washing, etc. Such detergents made from fatty alcohols were said by Canada Packers and Procter and Gamble to have qualities which recommend their use, particularly where biodegradability in sewage treatment plants is important. These companies, who claimed to be the largest consumers of fatty alcohols in Canada, recommended special duty-free treatment for fatty alcohols in contrast to alkyl benzene. However, Lever Brothers Limited and Colgate-Palmolive Limited, who make detergents from alkyl benzene, argued that fatty alcohols are competitive in use with alkyl benzene. The effect of these arguments on tariff proposals is developed later, and a more extensive discussion of biodegradability in detergents is presented under heading 34.02.

Fatty alcohols are not made in Canada. They are imported from a number of countries but chiefly from the United States. The following table gives pertinent details of imports.

(1) Transcript, Vol. 49, p. 7433

(2) Same, Vol. 49, p. 7439

Value of Imports of Fatty Alcohols,
1959-1964

<u>Year</u>	<u>Total Value \$'000</u>	<u>Value of Dutiable Imports \$'000</u>	<u>Value of Imports from U.S.A. \$'000</u>	<u>Value of Imports from U.K. \$'000</u>	<u>Value of Imports from W. Germany \$'000</u>
1959	1,949	14	1,728	3	217
1960	1,542	22	1,402	2	136
1961	1,914	54	1,717	3	188
1962	1,756	87	1,512	2	237
1963	1,799	69	1,538	8	254
1964	2,640	..	2,099	262	269

Source: D.B.S., Trade of Canada, Imports, s.c. 8435

Tariff Considerations

Fatty alcohols are currently imported into Canada free of duty under tariff item 865 for use in making synthetic detergents. The small quantities which are not entered duty-free are, for the most part, entered from the U.S.A., dutiable at 15 p.c., M.F.N., under item 208t.

Canada Packers Limited and Procter and Gamble Company of Canada, Limited submitted a joint proposal on this subject before the Board, recommending that rates of duty on fatty alcohol blends continue to be free while not made in Canada. When made, presumably the products might be dutiable at rates of 15 p.c., B.P., 20 p.c., M.F.N., as proposed generally by the industry. The companies specifically restricted their recommendation to "fatty alcohol blends derived from vegetable and/or animal fats and oils containing some or all of the following alcohols as active ingredients:

lauryl alcohol	(dodecanol)
myristic alcohol	(tetradecanol)
cetyl alcohol	(hexadecanol)
stearyl alcohol	(octadecanol)"(1)

The companies said that their recommendations do not embrace all the materials which could enter the description of fatty alcohol as shown in the Explanatory Notes to the Brussels Nomenclature. These companies contend that detergent products made from fatty alcohols have distinctive properties that separate them from detergents made from alkyl benzene and hence the two raw materials (fatty alcohols and alkyl benzene) are not competitive. As a result, they maintained, there is no justification for the proposal that fatty alcohols and alkyl benzene should have equal tariff treatment.

Lever Brothers Limited and Colgate-Palmolive Limited contended that fatty alcohols are competitive in this use with alkyl benzene and, therefore, the two should be accorded equal tariff treatment. Their spokesman said:

"Thirdly, I would like to make it clear before the Board and the representatives of Procter and Gamble that we are not recommending that fatty alcohols be dutiable; we are not recommending that they be not dutiable. We are saying as they are used for the same purpose as dodecyl benzene that they be accorded the same tariff terms."⁽¹⁾

There is no doubt that each of these products can be used to make detergents; Procter and Gamble, in fact, uses both. The use of fatty alcohols and alkyl benzenes in surface-active preparations is discussed more fully under heading 34.02. However, acceptability of one raw material over the other rests to a large degree on consumer acceptance of the products made from them.

Shawinigan Chemicals Limited noted that there was apparently no conflict between the duty-free proposal by the users of fatty alcohols and the company's own proposal for rates of 15 p.c., B.P., 20 p.c., M.F.N. Shawinigan asked that care be taken to ensure that any duty-free provision not be construed as including alcohols or mixtures of alcohols made by the "Oxo" process. A suggested wording was given as follows to accomplish the company's aim:

"Lauryl alcohol, myristal alcohol, cetyl alcohol, stearyl alcohol, oleyl alcohol and mixtures thereof."⁽²⁾

GLYCEROL AND GLYCEROL LYES - B.T.N. 15.11

In the Brussels system of classification, this heading includes glycerol whether in the crude or refined form, including synthetic glycerol. It also covers glycerol lyes, residues from the preparation of fatty acids and soaps. However, the heading excludes glycerol put up as a medicament or with added pharmaceutical substances, as well as perfumed glycerol and glycerol with added cosmetics.

Glycerol is included in this part of the report because, chemically, it is an alcohol. It is a cleavage product of fats and oils.

The Industry Committee noted that its presentation before the Board was intended to have the same meaning as in the Brussels Nomenclature. The Committee spokesman said that the producers of glycerol have recommended rates for all goods of heading 15.11; for glycerol and glycerol lyes the recommended rates are 15 p.c., B.P. and 20 p.c., M.F.N.; for crude glycerol, duty-free entry under both the B.P. and M.F.N. Tariffs was suggested.⁽³⁾

(1) Transcript, Vol. 50, p. 7455

(2) Same, Vol. 48, p. 7195

(3) Same, Vol. 50, p. 7493

Glycerol

The Product and Method of Manufacture

It is customary to use the word "glycerol" to name the pure chemical product whose commercial grades, with varying proportions of glycerol, are also known as "glycerine." Glycerol is a clear, colourless neutral, syrupy liquid with a sweet taste. Soluble in water and alcohol, insoluble in benzene, chloroform and ether, it will absorb moisture, sulphur dioxide and hydrogen sulphide from air. The specific gravity of pure glycerol at 15°C is 1.26557.

Most of the world's supply of glycerine is produced as a co-product in the saponification or in the hydrolysis of fats. Saponification refers to converting fats and oils containing glycerides into soaps by decomposition with an alkali, while hydrolysis is the decomposition of a compound by reaction with water, the water also being decomposed.

In the saponification process, fats treated with an alkali, (usually sodium hydroxide) yield, along with soap stock, a "spent lye" consisting of glycerol solution and salt. This spent lye, filtered and concentrated, is "soap-lye crude", a grade of glycerine containing 80 per cent glycerol, 4 to 11 per cent salt, about 0.1 per cent soap and smaller amounts of organic impurities.

In the hydrolysis process, steam reacts continuously with hot fat. This produces a salt-free "sweet water" which, upon evaporation, yields a crude glycerine of 88 per cent glycerol content known as "saponification crude."

These two processes yield crude glycerine which can be refined, that is, purified and concentrated. It is purified chiefly by distillation in the presence of steam in vacuum stills, from which emanate the distilled glycerol vapours to be collected in condensers. These condensed vapours are then concentrated by further vacuum distillation to a strength of about 99 per cent glycerol which is known as dynamite grade. A pale yellow high-gravity, or industrial grade is made by passing the dynamite grade through activated carbon to remove colour. The U.S.P. grade is produced by again distilling the high-gravity or industrial grade and then bleaching it once more by passing it through activated carbon.

Since 1950, an ion-exchange process has provided an alternative means of purification without distillation. The purified glycerine is then concentrated by conventional vacuum distillation.

The ascendancy of detergents over soap, with the concomitant reduction in volume of glycerine produced, has encouraged the manufacture of glycerine from propylene of petroleum origin. Propylene is chlorinated to allyl chloride which in turn is converted to dichlorohydrins by reaction with hypochlorous acid. The dichlorohydrins are reacted with milk of lime to produce epichlorohydrin, converted to glycerine by hydrolysis with aqueous sodium hydroxide. The product, a dilute glycerine solution containing sodium chloride, is purified and concentrated by evaporation and distillation. This process yields no crude glycerine.

The various refined, or commercial grades of glycerine are named, in a general way, according to their uses and depend upon colour and the concentration of glycerol in them. Glycerine is manufactured to meet particular users' specifications as, for example, for food, as a plasticizer for cellophane, for explosives or for alkyd resins. Grades may be designated as crude and refined, with the refined further subdivided.

1. Crude Glycerine is usually 80 per cent or 88 per cent glycerol, depending upon its method of manufacture. While it is an important article of commerce, it has little direct utility.
2. Refined Glycerine
 - (a) Glycerine, U.S.P.: A clear, colourless product with a minimum specific gravity of 1.249 at 25°C; it is chemically pure except for some 4 per cent of water. It is employed for human consumption in drugs, food, toilet goods, tobacco, food wraps, cork bottle-crown liners, etc.
 - (b) High gravity glycerine: This commercial grade is commonly supplied at a concentration of not less than 99 per cent glycerol. It is used mainly in the manufacture of alkyd resin.
 - (c) Dynamite grade is comparable in concentration with high gravity glycerine but less emphasis is placed on colour requirements.
 - (d) Yellow distilled grade has a concentration of not less than 96 per cent glycerol with less critical colour standards.

A group of refiners of glycerine proposed the following specifications, designed to "delineate crude from refined glycerine."⁽¹⁾ To qualify as crude glycerine, a product must conform to all three specifications; all other glycerines, it was suggested, are to be regarded as refined.

Crude glycerine

- | | |
|----------------------|------------------------------|
| (1) Glycerol content | not greater than 95 per cent |
| (2) Alkalinity | not less than 0.1 per cent |
| (3) Ash content | not less than 0.2 per cent |

The objective of the specifications is to prevent the importation of refined glycerol under the guise of crude, at lower rates of duty. The suggested methods of determining glycerol content, alkalinity equivalent and ash content were those set out in the American Oil Chemists Society (A.O.C.S.) methods Ea6-51 and Ea2-38.⁽²⁾

⁽¹⁾ Transcript, Vol. 80, p. 12256

⁽²⁾ Same, Vol. 80, p. 12257

The Industry and the Market

Crude glycerine is made in Canada by the saponification and by the hydrolysis of fats. Refined glycerine also is made domestically from both Canadian and imported crude. Glycerine is made from propylene in the United States but not in Canada. While the demand for refined glycerine cannot be met in either country by refining the crude which is available from domestic fats, the Canadian market is said to be not large enough to justify a synthetic glycerine plant. Canadian refiners make up their deficiency in the supply of crude glycerine by importing it from the United States.

The following companies make crude glycerine in Canada, the asterisk designating participation in the presentation before the Board by a group of companies:

The Andrew Jergens Company Limited	Perth, Ont.
* Canada Packers Limited	Toronto, Ont.
* Emery Industries (Canada) Ltd.	London, Ont.
* W.C. Hardesty Company of Canada Limited	New Toronto, Ont.
* Lever Brothers Limited	Toronto, Ont.
* Procter & Gamble Company of Canada Ltd.	Hamilton, Ont.
J.B. Williams Company (Canada) Limited	Ville la Salle, Que.
Wonderful Soap Company	
(Swift Canadian Company Limited)	Guelph, Ont.

Glycerine is refined in Canada by the following companies, the asterisk having the same meaning as before:

* Canada Packers Limited	Toronto, Ont.
* Colgate-Palmolive Limited	Toronto, Ont.
* W.C. Hardesty Company of Canada Limited	New Toronto, Ont.
* Lever Brothers Limited	Toronto, Ont.
* Procter & Gamble Company of Canada Ltd.	Hamilton, Ont.

At the time of the hearing, Canadian plants had the capacity to make about 20 million pounds of refined glycerine per year. A part of this capacity is run at a low level, however, because some of the companies consider that it is not economic to import crude glycerine to refine with that of their own make.⁽¹⁾

Apparently over 90 per cent of the crude glycerine is used captively for refining. Conversely, over 90 per cent of refined glycerine is sold by the producers; small amounts are used captively in making toothpaste.

The market for refined glycerine was said to be about 14 million pounds per year.⁽²⁾ This quantity would have a value of about \$4 million at current prices. In 1962, Canadian plants shipped about 12 million pounds valued at some \$3.1 million; imports of refined glycerine were just over one million pounds with a value of \$259,000. The demand here accounted for, of 13.2 million pounds, therefore had a value of some \$3.4 million, an average value of approximately 26 cents a pound.

⁽¹⁾ Transcript, Vol. 50, p. 7492

⁽²⁾ Same, Vol. 50, p. 7492

The manufacturers of explosives, cellophane, varnish and resins consume most of the glycerine used in Canada, but it is used also in pharmaceutical preparations, cosmetics, printing inks, type-writer ribbons and other products. Because it is safe for human consumption it is used in food wraps, in confectionery and in tobacco. In many of these uses its ability to absorb moisture from the atmosphere and its qualities as a lubricant are important. It may also be used as an anti-freeze but in this use it has been largely supplanted by ethylene glycol.

The following table shows some of the more important uses of refined glycerine. Plastics and synthetic resins have consistently been the largest users, followed by paints and varnish. Consumption for explosives has shown a decline but a spokesman for Canadian Industries Limited expressed the view that this declining trend has levelled off.

Selected Uses of Refined Glycerine
1962

<u>Use</u>	<u>Quantity</u> '000 lb.	<u>Value</u> \$'000	<u>Unit Value</u> \$/lb.
Pharmaceutical	892	252	.28
Paint and Varnish	2,472	663	.27
Plastics and Synthetic Resins	3,638	900	.25
Industrial Chemicals	1,198	186	.16
Explosives	<u>1,830</u>	<u>421</u>	<u>.23</u>
Total Accounted For	10,030	2,422	.24

Source: D.B.S., various publications

In their presentation to the Board, the group of companies estimated that "glycerine has been replaced by substitutes to the extent of at least 25 per cent."⁽¹⁾ Pentaerythritol has replaced some glycerine in the manufacture of alkyd resins; glycols have replaced some in alkyd resins and cosmetics; sorbitol has replaced some in tobacco and toothpaste.

Imports are a substantial factor in the supply of crude glycerine; on the basis of total Canadian requirements of crude glycerine, including captive use in refining, imports would appear to have supplied approximately 40 per cent in 1962. Refiners maintained that imports of crude glycerine are a necessity because an insufficient volume is made in Canada to meet their needs. On the other hand, imports have provided only about 10 per cent of demand for refined glycerine. Within the refined groups, however, importations vary considerably in relative importance, with those of the dynamite grade being relatively much more important than some of the others. This reflects, in part, regional considerations; the Board was informed that dynamite grade is imported to supply the explosives plant at Ogden,

⁽¹⁾ Transcript, Vol. 50, p. 7489

Alberta and James Island, British Columbia because of the cost of transportation from plants in Central Canada. Since 1959 almost all imports have come to Canada from the United States. There were said to be no exports of significance of either crude or refined glycerine. (1)

Imports of Crude and Refined Glycerine,
1959-1964

Year	C r u d e			R e f i n e d					
				Dynamite Grade			Other Grades		
	'000 lb.	\$'000	\$/lb.	'000 lb.	\$'000	\$/lb.	'000 lb.	\$'000	\$/lb.
1959	8,509	1,668	.20	984	261	.26	431	117	.27
1960	6,807	1,361	.20	807	224	.28	522	149	.29
1961	6,447	942	.15	596	147	.25	456	113	.25
1962	5,559	737	.13	587	141	.24	519	118	.23
1963	6,804	835	.12	897	179	.20	950	193	.20
1964	8,207	1,307	.16	1,664	379	.23	2,558	756	.30

Source: D.B.S., Trade of Canada, Imports

In 1963, imports of refined glycerine were greatest into Alberta, followed by Quebec and Ontario, each of which, however, took about one-third of total imports.

The price of synthetic glycerine from petroleum origins appears to establish the prices at which the various grades of refined and, therefore, of crude glycerine are sold. While this applies particularly to the United States (synthetic glycerine is not made in Canada) the effect is transmitted to Canada because of imports from the U.S.A.

The price of crude glycerine was said to be generally higher in Canada than in the U.S.A. and this situation is suggested by the data in the following table. The lower U.S. price of crude glycerine was said to be the result of refiners' requirements for large volumes and their possession of adequate storage facilities which enabled them to buy the raw materials at reduced prices on world markets; Canadian companies were said to be denied access to these same sources because of insufficient storage facilities and the smaller market. The difference in price in the two countries, therefore, is somewhat exaggerated in the accompanying tabular comparison because of the smaller lot sizes used in the Canadian published data.

(1) Transcript, Vol. 50, p. 7540

Prices of Crude Glycerine,
1959-1965

Year	Canada	United States	
	88%	88%	80%
	Canadian cents per pound		
1959	22.5	19.7	17.7
1960	22 - 25.3	20.8	18.4
1961	22 - 25.3	18.9	17.2
1962	22 - 25.3	14.2	13.7
1963	22 - 25.3	12.9	11.9
1964	22 - 27	16.2	14.9
1965	22 - 27	15.7	14.3

Note: Canadian prices, drums, delivered, 5-ton lots, Ontario and Quebec; U.S. prices, tank cars, quoted on a delivered basis until 1964, then f.o.b. Midwest; U.S. price converted to Canadian equivalent at annual average noon rates of exchange

Source: Canadian Chemical Processing; Oil, Paint and Drug Reporter

The published prices for refined glycerine are also higher in Canada than in the U.S.A., no doubt in part because of the differential in the price of the crude. As with the crude, the differential in the prices of the refined is exaggerated in the accompanying table because of the smaller lot size in the Canadian quotation.

Prices of Refined Glycerine,
1959-1965

Year	Canada			United States			
	97%	U.S.P.	High Gravity	U.S.P. Natural 96%	U.S.P. Natural 99%	Natural High Gravity	Synthetic 99.5 + %
	Canadian cents per pound						
1959	27.5	34.8	33.3	26.9	27.9	27.8	27.9
1960	29.0	35.5	35.0	27.4	28.2	28.1	28.4
1961	29.3	31.8	32.3	26.6	27.5	27.4	27.6
1962	29.3	29.8	30.3	25.4	26.3	26.2	26.5
1963	27.3	27.5	28.0	19.2	19.8	19.7	20.0
1964	29.0	31.3	31.8	23.0	23.5	23.5	23.7
1965	29.0	31.8	32.3	23.5	24.2	24.1	24.3

Note: Canadian prices, returnable drums, delivered "East"; beginning in 1961 for single drums; U.S. prices, tank cars, delivered; U.S. prices converted to Canadian equivalent at annual average noon rates of exchange

Source: Canadian Chemical Processing; Oil, Paint and Drug Reporter

Tariff Considerations

Crude glycerine may be imported duty-free under tariff item 664(1) when imported by manufacturers for use in the manufacture of refined glycerine. Glycerine may be imported duty-free under tariff item 664(2) by manufacturers of explosives for use in the manufacture of explosives; the refined is so used. Refined glycerine, other than analytical reagent grade, more generally enters as an unenumerated article under tariff item 711 at rates of 15 p.c., B.P and 20 p.c., M.F.N.; the analytical reagent grade is dutiable under tariff item 208t at Free, B.P., 15 p.c., M.F.N.

The following companies presented a joint submission on glycerine at the hearing of June 16, 1961:

Canada Packers Limited	Toronto, Ont.
Colgate-Palmolive Limited	Toronto, Ont.
Emery Industries (Canada) Limited	London, Ont.
Harchem Limited	New Toronto, Ont.
Lever Brothers Limited	Toronto, Ont.
The Procter and Gamble Company of Canada Limited	Hamilton, Ont.

This group of companies recommended that crude glycerine be admitted free of duty and that all grades of refined glycerine bear rates of 15 p.c., B.P. and 20 p.c., M.F.N.⁽¹⁾ They pointed out at a later hearing that, if their recommendation for duty-free entry of crude glycerine is accepted, tariff item 664(1) could be deleted.⁽²⁾

In arguing for free entry for crude glycerine, the companies stressed the need for low-cost raw materials and noted that local producers of crude would not be adversely affected because over 90 per cent of the crude is produced for captive use.

Protection was said to be needed for refined glycerine because the increasing production of synthetic glycerine in the U.S.A. could drive down the price, resulting in imports into Canada that would deprive the domestic producers of part of the market. The companies argued that the whole market was needed to make the refining operations economically justifiable. The producers acknowledged that the explosives manufacturers were most directly affected by their recommendations but suggested that, because glycerine is subject to competition from other products and processing methods which set maximum prices, the explosives manufacturers would probably not be faced with general price increases.

Domestic producers of refined glycerine already enjoy 90 per cent of the market; it appears that the one significant additional market is the explosives industry in Alberta which would almost certainly be faced with higher raw material cost whether importing over the proposed rates of duty or paying transportation from Central Canada. This additional market is not very large; if in 1963 all imports of dynamite grade glycerine had been replaced by Canadian, the additional sales would have been about \$180,000 in a value of shipments of some

(1) Transcript, Vol. 50, p. 7503

(2) Same, Vol. 80, p. 12256

\$3 million. In the same year, if all imports of refined grades (including dynamite grade), had been replaced by domestic production, additional sales of \$370,000 would have resulted.

With reference to the impact of an increase in the import duty on glycerine for use by manufacturers of explosives from Free to 15 p.c., B.P. and 20 p.c., M.F.N., the spokesman for Canadian Industries Limited said:

"As a result of the change we would probably purchase an increased amount of glycerine in Canada than we now do, since we are currently importing glycerine for use at our Calgary explosives plant; whereas, under these changed conditions, we would expect to purchase these requirements from domestic sources."(1)

No particular support was advanced for the proposed duty of 15 p.c., B.P., or to indicate why the 20 p.c., M.F.N. was specifically appropriate to meet the potential threat of imports of refined glycerine.

The glycerol lyes of heading 15.11 were not the subject of submissions before the Board. These are at present entered under tariff item 711 at rates of 15 p.c., B.P., 20 p.c., M.F.N. No representations were made that these be considered as chemicals within the scope of Reference 120.

ETHYL ALCOHOL - B.T.N. 22.08 AND 22.09

Ethyl alcohol, like the other alcohols classified in the Brussels Nomenclature under heading 29.04, is an acyclic alcohol. If it were under this heading, it would be classified as a monohydric alcohol similar, in this respect, to methanol or butanol. However, it is not included in the heading whether chemically pure or not, being classified instead under B.T.N. 22.08 and 22.09, depending upon strength and whether it is in the form of a beverage.

The Product

Ethyl alcohol is a colourless liquid with a distinctive odour. It boils at 78.2°C and is miscible in all proportions with water, ether, chloroform and a wide variety of organic compounds. It is available in various grades ranging from anhydrous to specially denatured and completely denatured. It is found also, with certain impurities, as alcoholic beverages.

Ethyl alcohol was included in Reference 120 by the Minister in the following words:

"It is my intention that the Board include in its study also Item 156(f) with reference to ethyl alcohol ..." (2)

(1) Transcript, Vol. 107, p. 16141

(2) Letter, Minister of Finance to Chairman, The Tariff Board, September 21, 1956

Item 156(f) has since been renumbered as 156(6) without change in wording. Throughout this report, where possible, reference will be made to the item as 156(6).

A principal proposal before the Board was for the reclassification of ethyl alcohol according to the B.T.N. system. Whereas Item 156(6) provides for ethyl alcohol of any strength, the Brussels Nomenclature divides undenatured alcohol on a strength of proof basis between the two headings 22.08 and 22.09. Denatured alcohol is classified by heading 22.08. The appropriate references are as follows:

a) Tariff 156(6)

"Ethyl alcohol, or the substance commonly known as alcohol, hydrated oxide of ethyl or spirits of wine, n.o.p.; spirituous or alcoholic liquors, n.o.p.; absinthe, arrack or palm spirit, artificial brandy and imitation of brandy, n.o.p.; cordials of all kinds, n.o.p.; mescal, pulque, rum shrub, schiedam and other schnapps; tafia, and alcoholic bitters or beverages, n.o.p.; and wines, n.o.p., containing more than forty per cent of proof spirit."

b) B.T.N. 22.08

"Ethyl alcohol or neutral spirits, undenatured, of a strength of eighty degrees or higher; denatured spirits (including ethyl alcohol and neutral spirits) of any strength."

c) B.T.N. 22.09

"Spirits (other than those of heading No. 22.08); liqueurs and other spirituous beverages; compound alcoholic preparations (known as "concentrated extracts") for the manufacture of beverages."(1)

Ethyl alcohol of item 156(6), therefore, is classified by B.T.N. headings 22.08 and 22.09. The Minister's intention is here further interpreted as excluding ethyl alcohol as it occurs in prepared beverages, but including other forms, of which the denatured, or "industrial" was the subject of most representations before the Board. It should be noted that the beverage ethyl alcohol may be chemically identical with the industrial ethyl alcohol.

The reference to Brussels Nomenclature requires a definition of "spirits" or "neutral spirits". According to the Explanatory Notes to the Brussels Nomenclature, "neutral spirits are mixtures of ethyl alcohol and water from which the secondary constituents (higher alcohols, esters, aldehydes, acids, etc.) present in the first distillate have been almost completely removed by fractional distillation." The secondary constituents alluded to are the substances which lend the characteristic flavours and aromas to the various alcoholic beverages.

(1) Explanatory Notes, Vol. 1, p. 98-9

The Encyclopaedia Britannica describes the process of distillation and the achievement of spirits thus: "Finally, the vapour issuing from the top of the column is condensed as high-strength spirit containing few impurities and known as plain, neutral, silent, velvet or cologne spirit. It is used to dilute other alcoholic drinks which are too highly flavoured, to prepare compounded spirits and to fortify weak wines; the rest of it finds an outlet in industry."⁽¹⁾ As ethyl alcohol boils much more readily than water, the product of careful distillation would contain little water.

In Canada, the various levels of government zealously watch the production, distribution and sale of ethyl alcohol to control its use and because, as a beverage, it is an important source of revenue and the beverage-industrial materials may be identical. To ensure that the product destined for uncontrolled industrial use is not suitable for use as a beverage, specified adulterants are usually added to make "denatured ethyl alcohol" or "denatured neutral spirits." These may be partially denatured or completely denatured, depending upon the ultimate use to which they are to be put. The denaturants used in other countries are frequently not acceptable to the Canadian authorities who specify those that may be used. Exporters to Canada of denatured ethyl alcohol must have the formula of the denaturant approved by the Excise Division of the Department of National Revenue, Canada, before any importation as denatured alcohol may be entered. For certain purposes, undenatured alcohol is released, subject to excise control.

B.T.N. heading 22.08 refers to a strength of eighty degrees or higher. This is a measure based on the Gay-Lussac hydrometer. The legal gauge in Canada is the Sikes hydrometer on which 140 degrees is the equal of 80 degrees on the Gay-Lussac instrument. A reading of 100 on the Sikes hydrometer is the standard figure for Proof Spirit. Spirit weaker than 100 Proof is spoken of as "under proof"; spirit stronger than 100 Proof is "over proof." "Proof Spirits" or "Spirits of the Strength of Proof" means any spirit having the strength of proof indicated by Sikes hydrometer; that is, any spirit which at the temperature of 51°F weighs exactly twelve-thirteenths of the weight of an equal measure of distilled water at the same temperature. This condition for proof spirit is satisfied by a mixture of alcohol and water where the alcohol is present to the extent of 57.1 per cent by weight, the balance (42.9 per cent) being water. Because in Canada proof spirit is prepared by mixing appropriate weights of alcohol and water, and in the United States it is prepared by mixing equal volumes of alcohol and water, spirits of equal strength in the two countries do not have equal numbers assigned to them. The maximum strength of ethyl alcohol in the United States is 200 per cent proof spirit, whereas in Canada, the same maximum strength material is designated as 175.3 per cent proof spirit.

In summary, this report deals with ethyl alcohol (neutral spirits), denatured or undenatured, in all strengths. Alcoholic beverages are not included in this study.

⁽¹⁾ Encyclopaedia Britannica, Vol. 1, p. 544A

Process of Manufacture

Ethyl alcohol may be produced by fermenting a sugar-containing substance such as molasses derived from sugar cane or sugar beets. Alternatively, the sugar may be obtained by the conversion of the starch in various grains or potatoes. The diluted sugar, with nutrients and yeast added, is allowed to ferment in tanks where the mixture is converted to "beer" containing 8 to 10 per cent alcohol and carbon dioxide. In a beer still, the alcohol and other volatile materials, such as aldehydes, are distilled off and the resulting concentrates ("high wine") contains 50 to 60 per cent alcohol. Further distillation removes the aldehydes and other impurities, leaving about 95 per cent alcohol. Anhydrous, or absolute alcohol is produced by adding a third constituent such as benzene which, when the mixture is distilled, carries off the water, leaving anhydrous alcohol.

In another process, ethylene can be converted to ethyl alcohol by hydrolyzing the mixture of ethyl sulphates produced when ethylene is absorbed in sulphuric acid. The crude alcohol is then purified in much the same way as that in the fermentation process. In addition, ethylene can be converted directly to ethyl alcohol by passing a vaporized mixture of ethylene and water over a catalyst made by impregnating diatomaceous earth with phosphoric acid.

The fermentation of sulphite waste liquor from wood pulp operations is a significant source of ethyl alcohol. In the manufacture of sulphite wood pulp, wood chips are cooked in an aqueous solution of calcium bisulphite and sulphurous acid. The cooking sets free cellulose fibres which must be separated from the liquor. The liquor contains such dissolved wood constituents as lignins and sugars, as well as the spent chemicals used in the pulping process. After urea has been added to the liquor as a nutrient, the mixture is pumped to fermentation tanks where yeast is added. After an appropriate time, the yeast is separated by centrifuge from the fermented liquor (wort) and the clarified beer, containing about 1 per cent alcohol by volume, is pumped to a beer still. There the alcohol is distilled off and concentrated to about 95 per cent and aldehydes and other impurities removed by further distillation. Residual impurities are removed by vaporizing the alcohol which, after condensation, goes to storage.

The Industry

The industrial ethyl alcohol industry is currently the object of a changing technology. The United States producers, by the end of 1962, had switched all but an insignificant share of production from fermentation processes to a process using ethylene as a raw material.⁽¹⁾ At the same time that the new technology has created this new route to ethyl alcohol, it has robbed the alcohol of its major industrial market, the manufacture of acetaldehyde. In the past, acetaldehyde was made from ethyl alcohol but now it, too, is made from ethylene and as a result, the market for ethyl alcohol is expected to decline. The 149 million wine gallons consumed in 1961 for acetaldehyde is expected to drop to about 98 million gallons by 1968.⁽²⁾

(1) Chemical Week, April 18, 1964, p. 60

(2) Same, p. 59

In Canada, on the other hand, the outlook is different. Acetaldehyde, long made here from ethylene, was never a significant outlet for ethyl alcohol; hence the Canadian industry is not subjected to the disruptive influence involved in the loss of this market. Ethyl alcohol is not made synthetically in Canada because the market is not sufficiently large to accommodate the large-capacity plants necessary for economic production. It continues, as in the past, to be made by fermentation processes used by companies engaged in distilling alcoholic beverages and those who confine their product to the industrial grades. The fermentation of sulphite waste liquor is an important source of ethyl alcohol in this country; in 1959, it provided nearly 70 per cent of all industrial ethyl alcohol made as such.⁽¹⁾ However, because beverage ethyl alcohol is chemically identical with industrial ethyl alcohol, the beverage manufacturers frequently put some of their product on the industrial market, particularly if it happens to be off grade for beverage purposes.

Productive capacity in Canada was said to be adequate to satisfy the domestic market, there being no imports.⁽²⁾

Investment in fermentation plants of the kind used in Canada are, apparently, significantly lower than in the synthetic plants as used in the United States. A synthetic plant costs "in the neighbourhood of \$650,000 to \$750,000 per million gallons of annual capacity", compared with a cost of possibly half that amount for a molasses plant. The capacity of a small synthetic plant is 12 million gallons per year; fermentation plants are generally economic in the range of 3.5 million gallons per year.⁽³⁾

The following companies were said to be producers of ethyl alcohol and denatured alcohols for industrial use.⁽⁴⁾

Alberta Distillers Limited	Calgary, Alberta
The Corby Distillers Ltd.	Corbyville, Ontario
* Commercial Alcohols Ltd.	Gatineau, Quebec
* Consolidated Alcohols Ltd.	Toronto, Ontario
* Distillers - Seagram	Ville la Salle, Quebec
Hiram Walker & Sons	Walkerville, Ontario
McGuinness Maritime Distillers	Bridgetown, Nova Scotia
Melchers Distilleries Ltd.	Berthierville, Quebec
* Ontario Paper Co.	Thorold, Ontario
* Reliance Chemicals, Ltd.	Amherstburg, Ontario
Thos. Adams Distilleries Ltd.	Vancouver, British Columbia

* Listed as major producers, producing specially for industrial uses. The companies not marked with an asterisk "fairly regularly direct supplies to the industrial alcohol market."⁽⁵⁾

There are other producers of beverage alcohols who infrequently put ethyl alcohol on the industrial market.

(1) D.B.S., The Distilling Industry, Cat. No. 32-206

(2) Transcript, Vol. 50, p. 7592

(3) Industrial Chemicals, p. 359

(4) Transcript, Vol. 50, p. 7604

(5) Same, Vol. 50, p. 7590

The Market

Of a total of about 33.7 million proof gallons of new spirits produced during 1961 and valued for inventory at \$17.4 million, about 4.7 million proof gallons were produced as industrial alcohol, similarly valued at \$1.7 million, or about 36 cents per proof gallon. In 1962, the latest year for which such data are available, about 4.4 million proof gallons of industrial alcohol were produced, valued at about \$1.6 million, again an average value of 36 cents per proof gallon. Production of industrial alcohol during the earlier five years, 1956-1960, ranged around 6 million proof gallons which had a value for inventory of approximately \$2 million, generally about the same average value per proof gallon as in 1961 and 1962.

Much of the industrial ethyl alcohol manufactured is denatured to make it unfit for use as a beverage. The greater part of the undenatured alcohol is used in Canada for making vinegar, though some is used in food essences and extracts, pharmaceuticals and antibiotics, detergents, cosmetics and organic solvents. Specially denatured ethyl alcohol also is used for all these purposes except for vinegar. Totally denatured ethyl alcohol, not subject to controls under the Excise Act on sale, distribution or use, is used as a general solvent, in paints and varnish, in the manufacture of printing inks and, to some extent, in making anti-freeze. The following table shows consumption in some industries for which data are available.

Consumption of Ethyl Alcohol
(excluding beverage uses)

<u>Industry</u>	<u>Unit of Quantity</u>	<u>1961</u>			<u>1962</u>		
		<u>Quan- tity</u> '000	<u>Value</u> \$'000	<u>Unit Value</u> \$/unit	<u>Quan- tity</u> '000	<u>Value</u> \$'000	<u>Unit Value</u> \$/unit
1) Pharmaceuticals and medicine	Imp. gal.	180	381	2.12	187	405	2.16
2) Paint and Varnish	lb.	1,765	167	.10	2,286	208	.09
3) Plastics & Synthetic resins	Imp. gal.	168	158	.94	109	101	.93
4) Soap and cleaning compounds	Imp. gal.	521	519	1.00	555	547	.99
5) Toilet preparations	Imp. gal.	294	316	1.07	270	290	1.07
6) Other chemical ind.	Imp. gal.	65	75	1.16	75	86	1.15
7) Industrial chemicals	Imp. gal.	1.8	1.6	.87	-	-	-
8) Misc. food preparations	Pf. gal.	98	253	2.57	120	305	2.54
9) Fruit & Veg. canners & preservers	Pf. gal.	1,193	685	.57	1,256	682	.54

Source: D.B.S., various publications

The preceding table records a value of consumption of approximately \$2.6 million in 1961 and 1962. The total value of sales of industrial ethyl alcohol during 1961 was about \$3.9 million and in 1962 about \$4.3 million. Thus, the uses listed above represent just over 60 per cent of total sales. The major portion of the industrial alcohol was said to be denatured.

It was brought to the attention of the Board that while ethyl alcohol is sold in tank cars, tank wagons and drums, over 50 per cent of the market consists of purchases of small quantities, frequently as small as a single drum. Ontario and Quebec account for the bulk of the purchases in both large and small lots, although purchasers buying in drums are spread across Canada.⁽¹⁾

The published price of U.S. 190 proof (95 per cent alcohol by volume) ethyl alcohol in the United States, in tanks, delivered east of the Rockies, has been 52 cents per U.S. gallon for some years; in drums, in March, 1962, it was 73 cents on the same basis.⁽²⁾ In Canada, the price of 165 proof ethyl alcohol, approximately the same strength as that quoted for the U.S. (94.11 per cent alcohol by volume), in tanks, delivered Quebec and Ontario south of North Bay, was said to be 96 cents per Imperial gallon; in drums on the same basis it was \$1.06 in 1961.⁽³⁾

The published price of one grade of denatured alcohol in the United States (known as proprietary solvent) in tank cars, delivered east of the Rockies, has been 56 cents per U.S. gallon at least since 1959. The price in Canada for denatured alcohol in tank car lots delivered in Quebec and Ontario south of North Bay was 87 cents per Imperial gallon in 1961; in drums, 97 cents per gallon.

The following table shows an approximate comparison of prices between the two countries; the United States data are converted to Imperial gallons and to Canadian funds. The Canadian price was about 52 per cent higher than the U.S. price for undenatured ethyl alcohol, and about 28 per cent higher for the denatured material.

Approximate Prices of Ethyl Alcohol
Canada and the United States
1961

	<u>Canada</u>	<u>United States</u>
	Canadian cents per Imperial Gallon	
Undenatured	96	63
Vinegar grade	82½	..
Denatured	87	68

Proof: U.S.A. 190 proof spirit; Canada 165 proof spirit; these are of approximately equal strength; the U.S. 190 proof spirit contains 95 per cent alcohol by volume while the Canadian 165 proof spirit contains 94.11 per cent alcohol by volume.

Note: U.S. prices have been converted to Imperial gallon basis and to Canadian funds at annual average noon rates of exchange

Source: Transcript, Vol. 50, p. 7592; Oil, Paint and Drug Reporter

(1) Transcript, Vol. 50, p. 7592

(2) Oil, Paint and Drug Reporter

(3) Transcript, Vol. 50, p. 7592

Tariff Considerations

Ethyl alcohol may currently be imported into Canada under tariff item 156(6) or 157 as follows:

	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
156(6) ⁽¹⁾		
Ethyl alcohol, or the substance commonly known as alcohol, hydrated oxide of ethyl or spirits of wine, n.o.p.; spirituous or alcoholic liquors, n.o.p.; absinthe, arrack or palm spirit, artificial brandy and imitations of brandy, n.o.p.; cordials of all kinds, n.o.p.; mescal, pulque, rum shrub, schiedem and other schnapps; tafia, and alcoholic bitters or beverages, n.o.p.; and wines, n.o.p., containing more than forty per cent of proof spirit		
per gallon of the strength of proof	\$5.00	\$10.00
and in addition thereto, under all tariffs,		
\$9.00 per gallon of the strength of proof		
When the goods specified in item 156 are of greater or less strength than the strength of proof, the measurement thereof and the amount of duty payable thereon shall be increased or decreased in proportion for any greater or less strength than the strength of proof.		
157		
Ethyl alcohol, when imported by the Department of National Revenue or by a person licensed by the Minister, to be denatured for use in the arts and industries, and for fuel, light and power, to be entered at ports prescribed by regulation of the Minister, subject to the Excise Act and to the Regulations of the Department of National Revenue	Free	Free

⁽¹⁾ At the time of the hearing, the item was numbered 156(f). The change in number involved no change in wording

Representations were made before the Board by the Association of Canadian Distillers. The Association represents every licensed distiller of beverage spirits in Canada and its proposal was reported to express the unanimous opinion of this industry.(1)

"We recommend to the Tariff Board that the existing tariff Item 156(f) which covers ethyl alcohol and a wide range of other beverage spirits containing more than 40% of proof spirit remain unchanged."(2)

The purpose of the Association's submission was to retain the present provision unchanged as to wording and rates.

In addition, the following three companies made a joint representation to the Board:

Commercial Alcohols Limited	Gatineau, Quebec
Consolidated Alcohols Limited	Toronto, Ontario
Ontario Paper Company Limited	Thorold, Ontario

These companies produce industrial alcohol. Basically they asked "for duty rates which will exclude imported materials from this country -- exclude them by economic penalty of duty rates so that no one will bring them in."(3) The rate proposed by this group is 30 cents per proof gallon, although their spokesman said that, from the viewpoint of excluding imports:

"I suppose it doesn't make much difference whether we use the rates that have been proposed now or the rates under 156f; and if that would make for a simplified approach we would be perfectly happy to join in with the pattern of approach expressed by the Association of Canadian Distillers and say 'Let us leave 156f unchanged as to wording and rates'."(4)

It should be noted that, in addition to the rates of duty levied under tariff item 156f, there is levied a further duty of \$9 per gallon of the strength of proof. This alone provides a prohibitive barrier to imports, but "the 30 cents by itself, and ignoring the \$9, is probably just sufficient to keep out the complete and utter flood. We want this additional margin of safety."(5) The 30 cent per proof gallon tariff requested provides what the companies feel is a necessary safeguard.

At the price quoted in an earlier table for ethyl alcohol in the United States, the equivalent in Canada of 63 cents per Imperial gallon of 165 proof alcohol, the proposed duty of 30 cents per proof gallon would be approximately equivalent to 78.6 per cent ad valorem, and would raise the duty-paid price to \$1.125 per Imperial gallon, well above the 96 cents quoted as the Canadian price. The additional duty, resulting from the further specific rate of \$9 per proof under the

(1) Transcript, Vol. 50, p. 7559

(2) Same, Vol. 50, p. 7559

(3) Same, Vol. 50, p. 7568

(4) Same, Vol. 50, p. 7569

(5) Same, Vol. 50, p. 7575

Customs Tariff would be \$14.85, for a total duty paid price per Imperial gallon of 165 proof ethyl alcohol imported from the United States of \$15.975. Under the tariff rates currently applicable under Item 156(6), the total duty paid price would be \$31.98.

The companies contended that prohibitive rates under the Customs Tariff are relied upon to keep denatured ethyl alcohol from being imported to Canada. The types of materials used to denature it are strictly specified in Canada and the addition of the denaturants in Canada may be done only in distilleries under close supervision by the Department of National Revenue.

Both the existing rates of duty and the proposed rates are prohibitive for the importation of ethyl alcohol for industrial purposes. Spokesmen for the producers of alcohols in Canada noted that in industrial applications ethyl alcohol was substitutable for and competitive with various other alcohols, and that, both for ethyl alcohol and for alcohols more generally, there was, for the most part, adequate capacity in Canada. Attention was drawn to the fact that the existing rates of duty on ethyl alcohol had not been imposed for normal commercial protection and that for this reason the rates and the item were better left as they now are in the Customs Tariff.

The Industry Committee agreed with the Brussels Nomenclature in defining the meaning of ethyl alcohol for tariff purposes except that it proposed to alter the reference to a strength of 80 degrees to read 140 degrees on the Sikes hydrometer, as corresponding to Canadian testing apparatus.

It would appear that the 30 cents per proof gallon, alone, proposed by the group of companies would provide more than adequate protection to the Canadian Industry. It seems, also, that the tariff on ethyl alcohol is imposed at least as much to regulate another segment of industry (alcoholic beverages) as to assist domestic manufacturers.

Tariff item 157 is understood to have been inoperative for many years; imports under that item would be subject to an excise duty of 30 cents per proof gallon.

Ethyl alcohol was listed by the Canadian Pharmaceutical Manufacturers Association as a chemical in which its members were interested. The Association proposed rates of 15 p.c., B.P., 20 p.c., M.F.N. for chemicals made in Canada.

Polymer Corporation Limited included ethyl alcohol in a list of chemicals for which the duty-free provision of tariff item 851 was considered to be essential.

CYCLIC ALCOHOLS AND THEIR HALOGENATED, SULPHONATED,
NITRATED OR NITROSATED DERIVATIVES, B.T.N. 29.05

The Explanatory Notes to the Brussels Nomenclature, 1955, divide the above chemicals into two sub-headings:

- (A) "Cyclanic, Cyclenic or Cycloterpenic Alcohols and their Halogenated, Sulphonated, Nitrated or Nitrosated Derivatives," and
- (B) "Aromatic Alcohols and their Halogenated, Sulphonated, Nitrated or Nitrosated Derivatives"

Of the products of part (A), the Board heard representations on cyclohexanol, methylcyclohexanol, five cycloterpenic alcohols and menthol. The remainder of the products which came before the Board under B.T.N. 29.05, namely benzyl alcohol, phenyl ethyl alcohol, cinamyl alcohol, benzhydrol and benzaldehyde sodium bisulphite fall within part (B). Some uncertainty surrounds the classification of two chemicals: vanillin sodium bisulphite and heliotropine sodium bisulphite; these two appear to be more appropriately classified under headings 29.08 and 29.10, respectively.

The products are dealt with below, grouped generally into the (A) and (B) types.

Cyclohexanol

Cyclohexanol, at the time of the hearing in June, 1961, was produced in Canada only by Howards and Sons (Canada) Limited at Cornwall, Ontario. Production began in 1953. The company uses cyclohexanol captively in the manufacture of cyclohexanol phthalate, a plasticizer for synthetic resins.⁽¹⁾ Apart from this, the Canadian market was said not to exceed twenty tons a year, which is understood to be supplied, in the main, by Howards and Sons. Uses in Canada are as a solvent for soaps and sulphated fatty alcohols, natural and synthetic resins, oils, cellulose ethers, dyes, fats and waxes.⁽²⁾ Cyclohexanol mixed with cyclohexanone for the preparation of nylon intermediates does not result from the process used at Howards and Sons;⁽³⁾ this mixture, far more important in use, is not classified by this heading but is under heading 38.19. On the basis of 20 tons being "somewhere between 10 and 15 per cent of our total production,"⁽⁴⁾ Canadian production might be in the order of 200 tons per year which, at published prices would have a commercial value in excess of \$120,000. Imports and exports were reported to be very small and sporadic; the data available to the Board indicate that, in the first half of 1960, imports were only \$2,300⁽⁵⁾ which, according to published U.S. prices, would suggest imports of about four tons in that half-year.

(1) Transcript, Vol. 51, p. 7658, 7662

(2) Same, Vol. 51, p. 7660

(3) Same, Vol. 51, p. 7666-7

(4) Same, Vol. 51, p. 7668

(5) Dept. of Trade and Commerce; Spotlight on Chemicals, 1961

Published prices in the U.S.A. for cyclohexanol technical, in tank cars, freight allowed, were 26 cents per pound from 1959 to 1961 and 28 cents from 1962 to 1964, (1) while the Canadian price for ton lots, delivered in returnable drums (Ontario and Quebec), fell from 32½ cents per pound in 1959 to 31½ cents per pound in 1960 where it has remained. (2)

Imports of cyclohexanol may be entered under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. In seeking continuation of the same protection, Howards and Sons (Canada) Limited pointed out that the company's capacity could supply many times the entire non-captive Canadian market. The firm indicated "that the reduction or elimination of the present tariff ... would force us to lower our selling prices below the level required to provide for a satisfactory return on investments." (3)

The Canadian Pharmaceutical Manufacturers Association included cyclohexanol in a list of products of minor economic importance to its members. The Association requested rates of Free, B.P., 15 p.c., M.F.N. for these products when not made in Canada, when for use in the manufacture of pharmaceutical products, and rates of 15 p.c., B.P., 20 p.c., M.F.N. for the products when made in Canada. The product is ruled to be made in Canada.

Methylcyclohexanol

Methylcyclohexanol is also produced in Canada by Howards and Sons (Canada) Limited at Cornwall, Ontario; production began in 1953. The company uses methylcyclohexanol captively in the production of methylcyclohexanol phthalate, a plasticizer. The product's other uses, likewise, are much the same as those of cyclohexanol. The price in Canada is understood to be 30 cents per pound, in drums, f.o.b. plant. At the time of the hearing, the product was not made in the U.S.A.; any imports would come from Europe. As with cyclohexanol, the non-captive use of methylcyclohexanol is small, and Howards and Sons was said to have capacity more than enough to fill all commercial needs in Canada.

Methylcyclohexanol is ruled made in Canada, and imports would be dutiable under tariff item 711 at rates of 15 p.c., B.P., 20 p.c., M.F.N. The company's position was the same as that for cyclohexanol.

Cycloterpenic Alcohols

Hercules Powder Company (Canada) Limited made a submission on five cycloterpenic alcohols; terpin hydrate, terpineol, borneol, isoborneol, and fenchyl alcohol. Submissions on terpineol were also heard from W.J. Bush and Company (Canada) Limited and from the Toilet Goods Manufacturers Association. All five alcohols are derived from pine extracts and terpineol can be prepared artificially from turpentine. None of the five is made in Canada.

(1) Oil, Paint and Drug Reporter

(2) Canadian Chemical Processing

(3) Transcript, Vol. 51, p. 7665

Terpin hydrate (cis-1,8 - terpin hydrate) is available in highly purified form; it is used in medicinal preparations such as cough syrup and in the making of terpineol. In the first half of 1960, imports valued at \$352 were reported. The U.S. published price was 70 cents per pound, in drums at that time, but declined in 1963 to 58 cents.⁽¹⁾

Borneol's price in the U.S.A. has remained at \$2.75 per pound since 1958; the price of iso-borneol since 1959 has fluctuated between \$1.44 and \$2 per pound. No import or other data are available for these chemicals and no data are published for fenchyl alcohol. The submission by Hercules Powder Company with respect to the classification of these cycloterpenic alcohols is noted below with terpineol. All four alcohols may be entered under tariff item 208t at rates of Free, B.P., 15 p.c., M.F.N.

Free entry was urged by Hercules Powder Company (Canada) Limited.

Terpin hydrate was included in the list of products of minor importance to members of the Canadian Pharmaceutical Manufacturers Association for which rates of duty of Free, B.P., 15 p.c., M.F.N. were proposed for chemicals which are used for the manufacture of pharmaceutical preparations, when the chemicals are not made in Canada, and rates of 15 p.c., B.P., 20 p.c., M.F.N. were proposed for any that are made in Canada.

Borneol and iso-borneol were included in a list of products in which the Toilet Goods Manufacturers Association expressed an end-use interest. The Association was concerned about the possible loss of the provision of end-use item 264a, essential oils, natural and synthetic, n.o.p., for use in the manufacture of medicinal, flavouring or toilet preparations, because the "n.o.p." provision of that item might be regarded as less specific in the administration of the Tariff than the provision under items worded like the B.T.N. headings. The rates of duty for item 264a are Free, B.P., 7½ p.c., M.F.N. The Association proposed these rates for products available from production within the British Commonwealth; otherwise free-entry under both Tariffs should apply for the products when used by the toilet goods industry.

Terpineol

Commercial terpineol is usually a mixture of isomers, but remains classified under heading 29.05. Having a lilac odour, it occurs naturally in many essential oils or may be readily made from terpin hydrate (above). Principally used in the perfume and soap industries, it also is a raw material for synthesizing terpinyl acetate and other essential oils, and may serve as a bactericide, textile wetting agent, odourant and solvent.⁽²⁾

(1) Oil, Paint and Drug Reporter

(2) Transcript, Vol. 51, p. 7689

The Toilet Goods Manufacturers Association estimated that some 40,000 pounds of terpeneol were consumed in 1960, at an average price of 50 cents per pound. Published U.S. prices, at the time of the hearing, were 40 cents per pound for "prime" grade and 50 cents per pound for "extra". By 1963 to 1964, these had risen to at least 60 cents and 75 cents, respectively.(1)

Tariff item 261, "Turpentine, spirits of," allows duty-free entry of terpeneol under both the B.P. and M.F.N. Tariffs. The submission of W.J. Bush and Co. (Canada) Limited stated that some imports are dutiable at rates of Free, B.P., 15 p.c., M.F.N., the rates of item 208t.(2) W.J. Bush and Co. proposed the continuation of these "existing rates" and proposed that terpeneol revert to the proposed heading rates of 15 p.c., B.P., 20 p.c., M.F.N., if made in Canada.

The end-use proposals by the Toilet Goods Manufacturers Association and the Canadian Pharmaceutical Manufacturers Association for terpeneol were as noted above except that the product was referred to as one of the more important chemicals to members of the Pharmaceutical Manufacturers Association.

Continued free entry for terpeneol, as now provided under item 261, was proposed by Hercules Powder Company (Canada) Limited "in order to encourage the development of additional end uses and enlarge the market for these chemicals."(3)

Hercules Powder also made representation concerning the classification of the cycloterpenic alcohols. The company spokesman noted that:

"In summary, cycloterpenic alcohols occur in pine oils and other pine wood extracts (Brussels Nomenclature 38.07). When isolated and refined, they are properly classified as chemicals (Brussels Nomenclature 29.05 - Cyclic Alcohols). It is recommended a commercial product be classified a cycloterpenic alcohol for tariff purposes when containing
 (a) not less than 95% total cycloterpenic alcohols and
 (b) not less than 90% of the individual alcohol or its isomers.

All other mixtures of cycloterpenic alcohols are properly classified pine oils (Brussels Nomenclature 38.07)."(4)

Menthol

Menthol is the distinctive alcohol in oil of peppermint; it is not made in Canada. It is used largely in dental and toilet preparations, perfumery, confectionery, liqueurs and cigarettes. In 1963, seven countries supplied Canada with menthol valued at \$295,088. Of this value, Brazil supplied over one-half (\$150,726), China less than one-quarter (\$68,648) and the United States over one-tenth (\$33,504). Taiwan, West Germany, Hong Kong and Australia supplied the

(1) Oil, Paint and Drug Reporter

(2) Same, Vol. 51, p. 7699

(3) Same, Vol. 51, p. 7691

(4) Same, Vol. 51, p. 7689-90

remainder, while the United Kingdom, formerly a significant exporter, shipped none. In 1964, Brazil again supplied well over one-half (\$161,000), followed by China, the U.S.A., Hong Kong, The Netherlands, West Germany and the U.K.

The Toilet Goods Manufacturers Association, as users of menthol, asked for continued free entry of menthol as at present under item 264c, under both British Preferential and Most-Favoured-Nation Tariffs.

The Canadian Pharmaceutical Manufacturers Association included menthol on a list of the more important chemicals to its members. Its end-use proposal for menthol was as noted above for cyclohexanol.

Benzyl Alcohol

Benzyl alcohol, an aromatic alcohol, is not made in Canada. It is used in perfumes for cosmetics and soaps and in making stabilizers for vinyl type resins. Prices of two grades in the United States in 1964 were quoted as 42 cents and 46 cents per pound, respectively; in Canada, at the time of the hearing, prices were approximately 50 cents and 45 cents per pound. Annual consumption was estimated at not more than 20,000 pounds which would have a market value of about \$10,000.⁽¹⁾

Imports might enter under tariff item 208t at rates of Free, B.P., 15 p.c., M.F.N. and could be entered duty-free under tariff item 921 while not made in Canada. Two importers, W.J. Bush and Co. (Canada) Ltd. and A. Boake, Roberts and Co. Ltd., proposed continuation of the rates of item 208t; a third, Ferro Enamels (Canada) Limited, proposed free entry. The proposals of W.J. Bush and Ferro Enamels would apply only while the product is not made in Canada; otherwise rates of 15 p.c., B.P., 20 p.c., M.F.N. would apply. The Toilet Goods Manufacturers Association made the same end-use proposal for benzyl alcohol as has been noted above. Benzyl alcohol was included on the list of products of lesser importance to members of the Canadian Pharmaceutical Manufacturers Association. The end-use proposal of the Association has been noted.

Phenyl Ethyl Alcohol

Phenyl ethyl alcohol (2-Phenylethanol) is not made in Canada. It is a colourless liquid having a "honey-rose" odour, used in soaps and in toilet preparations. The Toilet Goods Manufacturers Association estimated 1960 consumption at about 12,000 pounds, with an average price of about one dollar per pound. A. Boake, Roberts and Co. Ltd., estimated the Canadian price at the time of the hearing to be \$1.25 per pound, and total consumption at not more than 20,000 pounds per year.⁽²⁾

⁽¹⁾ Transcript, Vol. 51, p. 7694, 7702

⁽²⁾ Same, Vol. 51, p. 7702

A. Boake, Roberts indicated that phenyl ethyl alcohol was dutiable under item 208t, Free, B.P., 15 p.c., M.F.N. and proposed continuation of these rates for the product until it is made in Canada. However, the product is dutiable under item 264a at rates of Free, B.P., 7½ p.c., M.F.N. This item is not in Reference 120.

The Toilet Goods Manufacturers Association noted the possibility of entry under item 264a, Free, B.P., 7½ p.c., M.F.N. and stated "We offer the same terms of reference ... as for benzyl alcohol." (1)

Cinnamyl Alcohol

Cinnamyl alcohol is a colourless crystalline solid with an odour like that of hyacinth. It is not made in Canada but is imported from the United Kingdom from the parent company of W.J. Bush and Co. (Canada) Ltd. Perfume manufacturers and the toilet goods industry use this alcohol. No data are available on consumption but quantities and value are believed to be small.

Cinnamyl alcohol was said to be dutiable under item 208t, Free, B.P., 15 p.c., M.F.N., though it might also be entered as an essential oil under item 264a, Free, B.P., 7½ p.c., M.F.N.

W.J. Bush and Co. proposed continuation of the existing rates of item 208t, until the product is made in Canada, at which time the rates would become, by the company's proposal, 15 p.c., B.P., 20 p.c., M.F.N.

The Toilet Goods Manufacturers Association included cinnamyl alcohol in the list of products for which it proposed the end-use item noted above.

Other Products

W.J. Bush and Co., Limited listed four other chemicals under this heading as "not made in Canada," but marketed in Canada by its subsidiary, W.J. Bush & Co. (Canada) Limited. These were:

Benzhydrol
Benzaldehyde sodium bisulphite
Heliotropine sodium bisulphite
Vanillin sodium bisulphite

As noted earlier in this section the last two named appear to be more correctly classified under headings 29.10 and 29.08.

Benzhydrol is used in chemical synthesis, especially for pharmaceuticals (e.g. antihistamines), and the three bisulphites are auxiliary brighteners used in the electro-plating industry. (2) Quantities imported and consumed, and prices of these goods, are not published.

(1) Transcript, Vol. 51, p. 7695

(2) Same, Vol. 51, p. 7700

As in the case of cinnamyl alcohol (above), the four chemicals mentioned are imported at rates of Free, B.P., 15 p.c., M.F.N. under item 208t. The importer seeks continuation of these rates until such time as the products are declared to be made in Canada, when "we would not object to duty reverting to the proposed rates of B.P. 15% M.F.N. 20%".

In addition to the above chemicals, the Canadian Pharmaceutical Manufacturers Association listed the following as products of lesser importance to its members. As noted above, the Association recommended that some end-use treatment be adopted for these chemicals. The Association recommended that rates of Free, B.P., 15 p.c., M.F.N. should apply to these chemicals when they are not made in Canada, and that the heading rates proposed by the Industry Committee, generally 15 p.c., B.P., 20 p.c., M.F.N., apply when the products are made in Canada. The remaining products on the Association's list, under heading 29.05 are:

cholesterol
 inositol
 5-beta-pregnane-3 alpha: 17 alpha: 20 alpha-triol
 methylandrostenediol
 phenylpropanolamine hydrochloride

These chemicals generally are imported under tariff item 208t at rates of Free, B.P., 15 p.c., M.F.N. Cholesterol is also named in tariff item 875a where it may be imported duty-free for use in the manufacture of antibiotics and similar products.

The Toilet Goods Manufacturers Association included in its end-use proposal trimethyl cyclohexanol, with the proposal that goods required by the industry as raw materials be dutiable as if under existing item 264a at rates of Free, B.P., 7½ p.c., M.F.N. if they are available from production within the British Commonwealth; otherwise entry should be duty-free under all Tariffs. This product is dutiable under item 208t at Free, B.P., 15 p.c., M.F.N. The Association indicated that, alternatively, its end-use interest could be served by deletion of the "n.o.p." provision of item 264a, if this would ensure that all synthetic essential oils used as materials by members of the Association were dutiable under that item. However, item 264a is not part of Reference 120. Many synthetic essential oils are classified by various headings of the B.T.N., including heading 29.05. The Association wanted to ensure that a general end-use provision would provide for all of these materials if for use by its members.

At the hearing on pesticides, in November 1962, a group of seven manufacturers of pesticides made a proposal concerning a list of biologically active materials for use in the manufacture of pesticide formulations. The list included bis (p-chlorophenyl) trichloroethanol of this heading. The companies were:

A.H. Howard Chemical Co. Ltd.
 Allied Chemical Services Ltd.
 Chipman Chemicals Ltd.
 Gallowhur Chemicals Canada Ltd.
 Manchester Products Ltd.
 Niagara Brand Chemicals
 Green Cross Division
 Sherwin Williams Co. of
 Canada Ltd.

Orangeville, Ontario
 Calgary, Alberta
 Hamilton, Ontario
 Lachine, Quebec
 Galt, Ontario
 Burlington, Ontario

Montreal, Quebec

The companies proposed:

"The signatories of this brief share the view of the Chemical Industry Committee that, when a biologically active chemical, now on Appendix II, is made in Canada, it should become subject to the duty rates which have been recommended for the appropriate B.T.N. heading."⁽¹⁾

The companies proposed duty-free entry for the materials until they are made in Canada. The proposal was based on the belief that a duty on biologically active materials, not made in Canada, would increase the prices of pesticides to Canadian users without producing off-setting advantages for any segment of industry.

The Industry Committee stated that all products of heading 29.05 of commercial significance were believed to be dealt with in the submissions before the Board. The Committee proposed that any other products of heading 29.05 which in future may attain commercial significance should "be accorded tariff treatment by the classification and rates of duty provided for heading No. 29.05."⁽²⁾ The proposed rates were 15 p.c., B.P., 20 p.c., M.F.N.

(1) Transcript, Vol. 108, p. 16332-3

(2) Same, Vol. 51, p. 7656-7

PHENOLS AND PHENOL ALCOHOLS - B.T.N. HEADING 29.06

"Phenols are obtained by replacing one or more hydrogen atoms of the benzene ring by the hydroxyl radical (-OH). Replacement of one hydrogen atom gives monohydric phenols (monophenols); if two hydrogen atoms are replaced, dihydric phenols (diphenols) are obtained; replacement of several hydrogen atoms results in polyhydric phenols (polyphenols)."(1)

The Brussels Nomenclature makes use of four categories for this heading, as follows:

- 1) Mononuclear monophenols; these are obtained when one benzene ring in a compound is affected by the substitution of hydroxyl radicals for hydrogen atoms.

Examples are phenols, cresols, xylenols.

- 2) Polynuclear monophenols; these are obtained when more than one benzene ring in a compound is affected by the substitution of hydroxyl radicals for hydrogen atoms.

Examples are naphthols and orthophenylphenol.

- 3) Polyphenols: examples are resorcinol, pyrogallol.

- 4) Phenol-alcohols: these are derived from the benzene ring by replacing one hydrogen atom with a phenolic hydroxyl group and another hydrogen atom with an alcoholic hydroxyl group; thus they have the characteristics of both phenols and alcohols. The most important is saliginin.

The word "phenols" is sometimes used in the trade in a generic sense to include many of the above products, such as xylenols and cresols which may also be separately defined. This use of the term very likely results from the production of tar acids in the coal tar industry where, historically, crude products in the form of mixtures of these chemicals often were produced and sold as phenols. Only separate, chemically defined compounds or mixtures of isomers in the pure or commercially pure state are classified by B.T.N. heading 29.06; other forms and mixtures are treated in the B.T.N. as crude materials of Chapter 27.

The other chemicals brought to the Board's attention within B.T.N. heading 29.06 are not very significant commercially. Classified as phenols, or phenol-alcohols, some are called cresols, xylenols or naphthenols and various modifications of these names. They are largely derived from the middle oils resulting from the distillation of the coal tar produced in making coke. As a group, they are known as tar acids.

(1) Explanatory Notes, p. 243

Phenol

Phenol (carbolic acid) is a white crystalline solid with a carbolic odour. Partially soluble in water and completely soluble in most organic solvents, phenol is extremely toxic.

It was originally derived from coal tar and some is still recovered from this source. However, the greater part is now manufactured from cumene, itself made from benzene and propylene.⁽¹⁾ The third source of phenol in Canada is toluene, used in an oxidation process involving a copper catalyst. Any advantage that this relatively new process might have depends in part upon the price of toluene remaining lower than that of benzene, the starting point of the phenol - via - toluene route.⁽²⁾

The Industry and The Market

Phenol is made in Canada by three companies, each using a different process:

- a) Dominion Tar and Chemical Company, Limited, of Toronto Ontario, which derives it from coal tar supplied by steel manufacturers. Production at the time of the hearing in 1961 was said to be about 1.7 million pounds per year.⁽³⁾
- b) Shawinigan Chemicals Limited, at Montreal East, Quebec, which makes it from cumene. Capacity is said to be over 40 million pounds of phenol per year.⁽⁴⁾ At the time of the public hearing this plant was under the company name of B.A.-Shawinigan Limited, now part of Shawinigan Chemicals Limited.
- c) Dow Chemical of Canada Limited, at Ladner, British Columbia, which makes phenol from toluene imported from the United States. Capacity has not been disclosed publicly. The Ladner plant was said to be using a new process not previously used anywhere in the world.

Total Canadian phenol capacity at the time of the hearing in 1961 was estimated at 60 to 80 million pounds annually, which the spokesman for Dow Chemical suggested was about double the size of the market.

Trade sources have estimated that consumption of phenol in Canada during 1962 amounted to about 38 million pounds, worth about \$5 million. Later information would indicate that consumption in 1964 exceeded 50 million pounds, though the increase in value would not be so substantial. The market was said to have grown at a rate of 7 to 10 per cent a year for the six or seven years prior to the hearing in 1961. Much the larger part of production is for commercial sale,

(1) Transcript, Vol. 51, p. 7709-10

(2) Chemical and Engineering News, April 27, 1964, p. 56

(3) Transcript, Vol. 51, p. 7769

(4) Chemistry in Canada, June, 1964, p. 23

although Dow Chemical expressed the belief that captive use would grow. Much of the captive use presumably would be for the manufacture of agricultural chemicals; Dow Chemical reported that it had been importing one million to one and one-half million pounds of phenol principally for the manufacture of 2,4-D. Dominion Tar and Chemical speaking of tar acids more generally suggested that their use in agricultural chemicals and other chemical products might ultimately exceed their use in the resin field.

Imports, which in earlier years supplied a substantial proportion of demand, declined in 1963 and 1964 to a position of very small commercial importance. By 1964, imports apparently accounted for not more than one per cent of consumption. Data on known imports are given in the table below and, in more detail, in the Statistical Appendix.

Imports of Phenol to Canada

<u>Year</u>	<u>Total Imports</u>		<u>Dutiable Imports</u>
	'000 lb.	\$'000	'000 lb.
1959	6,614	1,070	1,890
1960	4,790	749	2,431
1961	3,604	585	733
1962	2,128	313	386
1963	726	90	-
1964	463	53	22

Source: D.B.S., Trade of Canada, Imports, s.c. 8027

Exports were said by the spokesman for B.A.-Shawinigan Limited to have been "sizeable".⁽¹⁾ Published U.S. statistics show imports of phenol to the United States from Canada at only about 176 thousand pounds in 1962.⁽²⁾ No information was offered about other destinations for Canadian exports, but prohibitive tariffs in the U.S.A. were cited as inhibiting Canadian exports to that market; the ad valorem equivalent of the U.S. tariff on phenol was said to be approximately 35 per cent.⁽³⁾

The Board was advised that about 75 per cent of the phenol sold in Canada is used in making phenol formaldehyde compounds which include, in addition to resins used in adhesives for plywood and other products, resins used for moulding and in protective coatings. Some 20 per cent of the phenol consumed was said to go into the manufacture of chemical intermediates, which would include the use in agricultural chemicals, for example 2,4-D, and 5 per cent into such industrial processes as petroleum refining.

(1) Transcript, Vol. 51, p. 7741

(2) United States Imports of Merchandise for Consumption, Report FT-110

(3) Transcript, Vol. 51, p. 7719

Known Consumption of Phenol

<u>Industry</u>	<u>1962</u>	<u>1963</u>
	- million pounds -	
Plastics and synthetic resins	26.7	30.5
Industrial chemicals	3.6	6.0
Petroleum refineries	0.3	1.0
Other	<u>7.5</u>	<u>8.5</u>
Total of above	38.1	45.9

Source: Chemistry in Canada, July, 1965; Canadian Chemical Processing, July, 1964, July, 1965

The market for phenol was said by the spokesman for Dow Chemical to be "split ... roughly half and half between British Columbia and Ontario and Quebec." (1) The west coast market exists largely because of the demand for phenolic resins used in plywood adhesives. As has been noted previously, there is one producer of phenol in each of the provinces comprising the large market areas. Union Carbide (Canada) Limited noted that it was a very large user of phenol for moulding compounds and that its requirements were obtained from Canadian producers.

From 1959 to 1961, the published Canadian price of phenol was slightly higher than the United States price, but more recently it has been about the same as that quoted in the U.S.A. When allowance is made for the exchange rate of the dollar, the Canadian price is lower than the U.S. price expressed in terms of Canadian dollars. The objective, as explained by Shawinigan Chemicals Limited, was said to be to sell phenol at prices prevailing in the United States, which, effectively, are world prices.

Prices of Phenol
Canada and the United States

<u>Year</u>	<u>Canada</u>		<u>U.S.A.</u>	
	<u>Tanks</u>	<u>Drums</u>	<u>Tanks,</u>	<u>U.S. ¢/lb.</u>
	<u>Delivered</u>	<u>c/l. delivered</u>	<u>Freight allowed</u> ^(a)	
	-	Canadian cents per pound	-	
1959	17.5	19.5	16.8	16.5
1960	17.5	19.5	16.0	16.5
1961	18.0	20.0	17.7	14.5
1962	14.2	16.2	15.0	13.6
1963	12.1	14.1	12.1	11.25
1964	12.1	14.5	12.1	11.25
1965	12.1	14.5	12.2	11.25

(a) Converted to Canadian funds at annual average noon rates of exchange.

Source: Canadian Chemical Processing; Oil, Paint and Drug Reporter.

(1) Transcript, Vol. 51, p. 7754

Tariff Considerations

Phenol may be imported into Canada free of duty under both B.P. and M.F.N. Tariffs when for use in the manufacture of synthetic resin glues, under tariff item 922 or under item 851 when for use in the manufacture of synthetic rubber. Some might be entered duty-free under item 219a or 791 for disinfectant or pesticide use. For more general use it may be entered under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N.

Representations were made before the Board by three manufacturers and three consumers:

1. Manufacturers:

- a) Dominion Tar and Chemical Company Limited
- b) Dow Chemical of Canada Limited
- c) B.A.-Shawinigan Limited

2. Consumers:

- a) Canadian Marietta Limited (now Pacific Resins, Limited)
- b) Naugatuck Chemicals Division of Dominion Rubber Company, Limited
- c) Plywood Manufacturers Association of British Columbia

All three manufacturers proposed that rates of 15 p.c., B.P. and 20 p.c., M.F.N. should be applied on phenol imports.⁽¹⁾ Among the consumers, Canadian Marietta wanted phenol to be imported duty free and the Plywood Manufacturers Association wanted to see the rates currently in effect left unchanged.⁽²⁾ For the plywood manufacturers this proposal amounted to one for continued free entry. Naugatuck Chemicals said that, if the Board recommended the rates which the company proposed on the goods it manufactures, it would agree to the proposals of the companies making phenol, a raw material for Naugatuck; however, if the Board recommended lower rates on Naugatuck's products, the company wanted lower rates to be applied on the raw materials which it uses.⁽³⁾ The company's interest in materials included also, under heading 29.06, p-cresol, cresylic acids, hydroquinone, b-naphthol and nonyl phenol.

The spokesman for B.A.-Shawinigan Limited suggested that domestic producers need the protection afforded by rates of 15 p.c., B.P. and 20 p.c., M.F.N. to enable them to increase the volume of sales at prevailing United States prices: "It was not to increase the cost of the material to the users; it was to get the volume."⁽⁴⁾ The same company argued that protection was needed against the practice of United States parent companies supplying phenol to their Canadian subsidiaries in such a way as to benefit from the low cost of incremental production. While it was sold to the subsidiary at prevailing prices, the marginal

⁽¹⁾ Transcript, Vol. 51, p. 7723, 7752, 7772

⁽²⁾ Same, Vol. 51, p. 7784, 7789

⁽³⁾ Same, Vol. 6, p. 899-900

⁽⁴⁾ Same, Vol. 51, p. 7726 (See also p. 7745)

cost to the producer created a company-wide advantage and encouraged Canadian plants to buy foreign-made phenol. If such imports were to encounter a Canadian tariff, some of the advantage would be lost. The company proposed the elimination of end-use tariff items, and in particular, items 791 and 922.(1) The company noted further that duty-free entry or a rate of $7\frac{1}{2}$ p.c. applied, in large degree, to the products for which phenol is a raw material, and that increased protection should also apply to these products.

The proposal by Dominion Tar and Chemicals is dealt with below as more general to phenols, cresols and xylenols.

Dow Chemical of Canada, Limited was just about to bring into production its phenol plant at Ladner, B.C., and commented on the tariff situation in respect to the decision to construct the plant.

"We have gone ahead with the phenol plant in the full knowledge that there is no duty on three-quarters or so of the end uses, and I am sure our plants were not based on the expectation of any duty put on; we hope there will be ..."

Q. "The 15 per cent B.P. duty, then, would seem to be largely a question of consistency more than of logic or need?"

A. "Yes ... I think we would be unhappy with zero ... I think 15 per cent serves a useful purpose to prevent people from looking for a way to ship the material economically from overseas/."(2)

The Plywood Manufacturers Association of British Columbia was fearful that phenol prices would be increased under the protection of a tariff, and affect the cost of synthetic resins used in plywood manufacture. Shawinigan Chemicals' spokesman pointed out that phenol used ultimately for making plywood that is exported qualified for the drawback of duty, and argued that the plywood consumed domestically should be given no more favoured treatment than other products.(3)

Phenols, Cresols and Xylenols

Dominion Tar and Chemical Company Limited is one of the companies which produce these tar acids. At the hearing in June, 1961, the company stated that it produces tar acids at the rate of 5 million pounds per year. "Of this quantity 1,700,000 lb. are phenol and the remaining 3,300,000 lb. are cresols and xylenols. This latter volume is sufficient to satisfy the current Canadian demand for these tar acids."(4) In this form, the cresols and xylenols would be crude and, as such, excluded from heading 29.06, classified instead in Chapter 27 of the B.T.N. The separate, chemically defined compounds belonging in

(1) Transcript, Vol. 51, p. 7715

(2) Same, Vol. 51, p. 7759

(3) Same, Vol. 51, p. 7719

(4) Same, Vol. 51, p. 7769

this heading may be fractionally distilled from the crude tar acids. There are three isomers of cresol and six of xylene; mixtures of the isomers are included in heading 29.06, if in pure or commercially pure state.

Dominion Tar and Chemical's proposal was for tar acids more generally rather than for individual chemicals, saying that it "submits that the elimination of end-use duty free entry of tar acids, tar acid formulations and chemicals of tar acid manufacture would offer significant incentive for the domestic manufacture of a wider range of more valuable chemicals." (1) Some of these products would be mixtures more properly classified as crude materials not under heading 29.06; they are probably dutiable under item 711 of the existing Tariff at rates of 15 p.c., B.P., 20 p.c., M.F.N.

The Plywood Manufacturers Association of British Columbia expressed an interest in the three isomers (meta-, ortho-, and para-) of cresol, and in phenol, xylene and resorcinol. The Association's interest in phenol has been discussed under that chemical, but the Association maintained that, as the other chemicals are used in the manufacture of resins, they can be imported free of duty under end-use tariff item 921 if they are not produced in Canada. All three isomers of cresol could be imported duty-free under tariff items 219a and 791, for disinfectant use. M-cresol might be imported duty-free under tariff item 270, if for use in the concentration of ores. More generally, m-cresol and p-cresol are dutiable at Free, B.P., 15 p.c., M.F.N. under tariff item 208t; o-cresol is dutiable at 15 p.c., B.P., 20 p.c., M.F.N., under tariff item 711. The Association opposed "the recommendation that new rates of duty be established on these products which are needed for the manufacture of synthetic resins. We urge that current rates of duty on the products covered in this submission be left unchanged." (2) The spokesman for Shawinigan Chemicals Limited noted that "no cresols or xylenols are used in plywood", (3) and stated that the cost of the glue used in making plywood is small when compared to the selling price of plywood.

A submission on a group of chemicals was made to the Board by Hart Products Company of Canada Limited. The Company's list, as shown below, was divided into two parts. Those in the first part are made in Canada, although only the first is so ruled for tariff purposes; those in the second part are not, although they are said to be "directly competitive and in most cases may be used as a direct substitute for the product in paragraph (a)." (4)

- (a) Nonyl phenol
- Dodecyl phenol
- Dinonyl phenol
- Didodecyl phenol

(1) Transcript, Vol. 51, p. 7772

(2) Same, Vol. 51, p. 7789

(3) Same, Vol. 51, p. 7786

(4) Same, Vol. 52, p. 7829

- (b) Octyl phenol
- Diocetyl phenol
- Nonyl-o-cresol
- Dodecyl-o-cresol
- Octyl-o-cresol
- Dinonyl-o-cresol
- Didodecyl-o-cresol
- Diocetyl-o-cresol

The company stated that these chemicals are normally sold after having been further processed:

"These products are rarely used in the form covered in this brief as classified under Brussels Item 29.06, but are intermediates for further manufacture, usually into surface active agents."(1)

Hart Products Company recorded that, of this group, only nonyl phenol has been ruled made in Canada and therefore dutiable under tariff item 711 at 15 p.c., B.P. and 20 p.c., M.F.N. Although the company advised that it would request this status for dodecyl phenol, dinonyl phenol and didodecyl phenol, all of the eleven chemicals were dutiable under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. The company requested that rates of 15 p.c., B.P. and 20 p.c., M.F.N. should apply on all of these chemicals. When these products exist as single chemicals there was no doubt expressed that they are properly classified under B.T.N. heading 29.06; however when they occur as mixtures, as they might for use in surface active agents, the opinion was that they are classified under B.T.N. heading 34.02. No statistics are available for these products.

Union Carbide Canada Limited, Bakelite Division, submitted a proposal to the Board on three chemicals and a natural mixture of butyl phenols:

- para-tertiary-amyl phenol
- para-tertiary-butyl phenol
- para-phenyl phenol
- mixed butyl phenols

The first three are classified under B.T.N. heading 29.06 but the fourth, as a mixture, belongs elsewhere, probably under heading 38.19. None is made in Canada, but Union Carbide imports them from the United States to use as raw materials in the manufacture "of a special class of synthetic phenolic resins with unique properties. These resins are used ... in the production of exterior varnishes, marine finishes, primers for structural steel, chemical resistant finishes, can coatings and as modifiers in the manufacture of linoleum and adhesives."(2) There were said to be no known substitutes for these materials for the applications described. Imports of para-tertiary-butyl phenol were reported at \$100,000 in 1962.

(1) Transcript, Vol. 52, p. 7829

(2) Same, Vol. 51, p. 7805

These chemicals may be imported into Canada free of duty when for use in manufacturing resins under tariff item 921 and, in some cases, under other end-use items; when for other uses they may be entered under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. Union Carbide recommended that "the present duty free status of these products under tariff item 921 be maintained as exceptions to Brussels Heading 29.06 ..." (1) These rates would apply until the products are made in Canada. The company said that the cost of the chemicals as raw materials comprises from 45 per cent to 70 per cent of the cost of the resins made from them and that increases in the cost of the resins could restrict their use and result in the loss of a part of the market.

Bisphenol-A

A submission on bisphenol-A was made by B.A.-Shawinigan Limited. There are many bisphenols, but only bisphenol-A is made in Canada. Known also as 4,4-dihydroxydiphenol, 2,2-propane or para isopropylidenediphenol, it is made by B.A.-Shawinigan from phenol and acetone. All of the production is sold to manufacturers of epoxy resins and polycarbonate resins; none is used captively. There are no known imports of significance but some small exports. The price of bisphenol-A in the U.S.A. was said to be 30½ cents a pound and in Canada 28½ cents. (2) It could currently be entered into Canada under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. B.A.-Shawinigan recommended the continuation of these rates of duty and there was no opposition.

Para Cresol

Para cresol, one of three isomeric forms of cresol, can be made from coal tar or petroleum but when so made it cannot be separated from the other isomers on a commercial scale without prohibitive cost. (3) It is, however, manufactured in pure form from para-cymene, and is used in the very pure condition. It is not made in Canada, but is imported from the United Kingdom and the United States.

Imports of para cresol were estimated at the time of the hearing in 1961 at about 200,000 pounds annually with a duty-paid value of \$115,000. (4) Published data, however, indicate a value of imports in 1961 of \$295,000; imports increased to \$475,000 in 1962, but fell off to \$365,000 in 1963, the latest available year. Para cresol is used in Canada to make butylated hydroxy toluene (see below).

In addition to the interest already noted of the Plywood Manufacturers of British Columbia, information was presented to the Board on this chemical by Synthetic Chemicals Limited, Charles Albert Smith Limited, Hercules Powder Company (Canada) Limited and Harrisons & Crosfield (Canada) Limited. The first two named companies are associated, the first being the producer in the United Kingdom and Charles

(1) Transcript, Vol. 51, p. 7807

(2) Same, Vol. 51, p. 7800

(3) Same, Vol. 52, p. 7868

(4) Same, Vol. 52, p. 7869

Albert Smith the importer in Canada of the product made by Synthetic Chemicals. Both of these companies opposed any increase in the rates of duty applicable on para cresol and proposed that the rates currently imposed under tariff item 208t, Free, B.P. and 15 p.c., M.F.N., should be continued. This, they said, would avoid an increase in the cost of products made from para cresol and would "maintain the principle of British Preference."(1)

Hercules Powder Company imports and distributes para cresol from the parent company in the United States. The company said that "significant quantities have also been imported under Tariff Item 921 (O,B.P., O,M.F.N.) and Tariff Item 220e (O,B.P., 5%,M.F.N.) or duty drawback claimed against these items."(2) The company's recommendation was that para cresol should be admitted to Canada duty free because lower cost as a raw material would enable domestic producers of the product made from it to increase their production and sales in both domestic and world wide markets.

"It appears", the company said, "very unlikely that pure para cresol of a quality necessary for the manufacture of anti-oxidants could ever be manufactured in Canada. The capital investment required for erection of a unit to provide 200,000 pounds per year would be completely unrealistic in relation to the selling price of para cresol."(3)

Harrisons and Crosfield (Canada) Limited noted that pure para cresol is not made in Canada and recommended that it be admitted free of duty when it is of approximately the degree of purity (98.5 per cent to 99 per cent) offered by Hercules Powder Company (Canada) Limited. The company spokesman said:

"It is understood that when pure para cresol becomes commercially available from Canadian production we will not object to the application of the rates of duty suggested by the Industry Committee, 15%, B.P. and 20%, M.F.N."(4)

Butylated Hydroxy Toluene

Submissions on butylated hydroxy toluene were made by several companies. This chemical is known also as 2,6-di-tertiary-butyl-4 methyl phenol and as ditertiary butyl para cresol. It is the principal product made from para cresol and is made in Canada by Monsanto Canada Limited at Montreal and by Naugatuck Chemical Division of Dominion Rubber Company Limited at Elmira, Ontario.

Butylated hydroxy toluene is an anti-oxidant "used to extend the useful life of such diverse substances as vegetable, animal and fish oils, vegetable, animal and fish meals, petroleum products, rubber goods, etc."(5) In these uses it competes with "a host of different

(1) Transcript, Vol. 52, p. 7852, 7854

(2) Same, Vol. 52, p. 7869

(3) Same, Vol. 52, p. 7870

(4) Same, Vol. 52, p. 7888

(5) Same, Vol. 52, p. 7887

products." Produced in three grades, technical, feed grade and food grade, its price was said to be 67 cents, 78.5 cents and \$1.00 per pound respectively for each of these grades at the time of the hearing in 1961. These prices were higher than the price of comparable grades in the United States, the source of most import competition. From 1960 to 1965, published U.S. prices for feed and food grades were 65 cents a pound and, for the technical grade, 54 cents a pound.

The total market in Canada was "estimated at somewhat less than 500,000 lb. annually."(1) The spokesman for Monsanto expressed the opinion that Canadian producers have "very definitely well over one-half [of the market] ... I would suspect in the 70 to 80 per cent range, and possibly even higher than that."(2) The remainder is supplied by imports from the United States; these were valued at \$37,000 in 1964. There were said to be no known imports from the United Kingdom but small exports to the U.K.

Monsanto Canada Limited proposed that rates of 15 p.c., B.P. and 20 p.c., M.F.N. should be applied on butylated hydroxy toluene; these would be the same rates of duty as currently applicable under tariff item 711. The product might also qualify for entry, at these rates, under tariff item 220c; it may be entered duty-free under tariff item 851, when for use in the manufacture of synthetic rubber. In making this proposal the company said:

"A tariff rate over and above that required to cover the cost disparity between Canadian and foreign producers is needed to permit Canadian manufacturers of BHT to obtain maximum volume."(3)

The company spokesman maintained that the company would intend to use the tariff only to the extent of the difference between the costs of a foreign producer and the company's own costs, and not as an opportunity to raise the price of the product.

Harrisons and Crosfield (Canada) Limited, which purchases food and feed grades of butylated hydroxy toluene from a Canadian producer for resale, also recommended that it "be rated for duty purposes at 15%, B.P. and 20%, M.F.N."(4) Some might be imported duty-free for use as a fungicide under item 219a.

Hercules Powder Company (Canada) Limited said that they "support the Industry Committee's recommendation of 15%, B.P. and 20%, M.F.N. for 2,6-di-tertiary-butyl-4 methyl phenol."(5) The company distributes some of the product manufactured by one of the Canadian companies.

Sodium Ortho Phenylphenate

The Canadian Paint Varnish and Lacquer Association submitted details concerning sodium ortho phenylphenate to the Board. This

(1) Transcript, Vol. 52, p. 7893

(2) Same, Vol. 52, p. 7907

(3) Same, Vol. 52, p. 7896

(4) Same, Vol. 52, p. 7889

(5) Same, Vol. 52, p. 7867

product, not made in Canada but imported from the United States, is used as a germicidal and fungicidal additive to paint. Members of the Association were said to have used 33,850 pounds of it in 1960, worth \$16,920. It is currently imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. Some is thought to have been imported free under tariff item 921. The Association proposed that this chemical be admitted free of duty under both Tariffs until it is made in Canada, at which time rates of 15 p.c., B.P. and 20 p.c., M.F.N. could apply. There was no other proposal.

Beta Naphthol

Imperial Chemical Industries Limited, the Primary Textiles Institute and the Canadian Color Makers' Association submitted briefs on beta naphthol. This chemical, not made in Canada, is imported from the United Kingdom, where it is manufactured by Imperial Chemical Industries, and from West Germany in about equal quantities. It is made from naphthalene which, in Europe, is derived from coal tar and, apparently, has been in somewhat short supply in the U.K. For this reason, the availability of beta naphthol from West Germany was said to be advantageous to Canadian users.

It was estimated that over half of the use of beta naphthol in Canada is for the manufacture of dye colours or pigments, about a third for mining, where it is used to separate cobalt prior to the electrolytic refining of zinc, and the remainder to the textiles industry and rubber industry. The Canadian market, at the time of the hearing was said to be very small. Imports of beta naphthol flakes were reported to be \$85,000 in 1961, \$150,000 in 1962 and \$90,000 in 1963.

Beta naphthol is at present imported into Canada under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N., and free of duty under tariff item 203f when for the manufacture of coal tar dyes. While there is no coal tar dye industry in Canada, dyes are formed in the course of making pigments and for this reason beta naphthol may be imported under item 203f.

Imperial Chemical Industries recommended that the rates of Free, B.P. and 15 p.c., M.F.N., now applied under item 208t, be continued until this chemical is made in Canada, at which time rates of 15 p.c., B.P. and 20 p.c., M.F.N. should apply.

The Canadian Color Makers' Association requested that "beta naphthol be dutiable at rates of duty of 0%, B.P. and 0%, M.F.N. under the provisions of an end-use item until made in Canada."(1)

The Primary Textiles Institute noted that:

"the consumption by the primary textile manufacturers would not have been sufficient to lead us to ... propose an exception item for Beta Naphthol. However, since it has been so proposed by others, who presumably have a greater interest, we do wish to add our support to this proposal. Beta Naphthol is not to our knowledge available from Canadian manufacturers, and there

(1) Transcript, Vol. 52, p. 7934

is no substitute which will fulfill the uses to which it is put. Under these circumstances we see no reason why it should not be made available free of duty from both B.P. and M.F.N. countries.(1)

Resorcinol

Resorcinol is not made in Canada, but is imported from the United Kingdom, the United States, Germany and Holland in quantities of over 800,000 pounds in 1963 and 1964, valued at about \$500,000. This represents a progressive rise over the years from about \$165,000 in 1959. The price of the U.S. material was said to be not competitive with imports from European sources. About 95 per cent of the resorcinol used in Canada goes into the manufacture of resins and adhesives; in combination with formaldehyde, these resins are used as bonding agents in laminating wood, in rubber tires and rubber belts. Lesser quantities are used for fixing dyes in textiles, in explosives and very minor quantities in medicine.

The resorcinol formaldehyde resin adhesives are made in Canada by Monsanto Canada Limited. The company noted that these waterproof adhesives are characterized by a relatively high price. The published price in the U.S.A. of resorcinol itself was about 78.5 cents per pound until mid-1963; since then the price declined to 66.5 cents until 1965 when it rose to 68 cents a pound. Although, from a technical point of view, resorcinol is competitive with phenol in that it could replace phenol in certain adhesive applications, the much higher price of resorcinol renders economic substitution impractical. Monsanto recommended that this chemical be allowed duty-free entry until it is made in Canada; it is currently so admitted under tariff item 921.

The spokesman for Shawinigan Chemicals Limited noted that the company is "interested in this type of product as a possible product to manufacture ..."(2) The company therefore wants free entry only until resorcinol or a directly substitutable material is available from Canadian production, at which time rates of 15 p.c., B.P. and 20 p.c., M.F.N. should apply.

The Primary Textiles Institute said that resorcinol had been imported under tariff item 208t at rates of Free, B.P. and 15 p.c. M.F.N., but the Institute spokesman admitted that it usually would be correctly imported free of duty under item 921. The fabric manufacturers use it in making tire cord and various products such as belting, hose and similar products. The Institute recommended that resorcinol be admitted free of duty until such time as resorcinol or a directly substitutable material is available from Canadian production.(3)

The Rubber Association of Canada reported that its members use resorcinol in processing tire cord fabrics and textile cords for incorporation in V-belts and hose. The Association said that "in the

(1) Transcript, Vol. 52, p. 7943

(2) Same, Vol. 52, p. 7967

(3) Same, Vol. 52, p. 7969

considered opinion of the rubber industry there is no acceptable economical substitute for resorcinol in this application."(1) The Association agreed with the Industry Committee's recommendation for duty-free entry while resorcinol remains ruled not made in Canada. However, because the Association disagrees with the Industry Committee's adoption of the "class" basis for determining made-in-Canada status (a basis which it maintains is wider and more elastic than the "kind" basis which now prevails) and fears that this could result in resorcinol being ruled made-in-Canada and dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N., the Association "respectfully ask the Board to give careful consideration to this aspect of the Chemical Industry Committee recommendation respecting resorcinol."(2)

The Canadian Pharmaceutical Manufacturers Association recommended rates of Free, B.P., 15 p.c., M.F.N., until resorcinol is made in Canada, after which it would recommend rates of 15 p.c., B.P., 20 p.c., M.F.N.

L.B. Holliday and Company Limited, the sole manufacturer of resorcinol in the U.K., exports the product to Canada. The company said that the end-use provisions under tariff item 921 "enable Dutch and German suppliers to lay down this product in Canada at prices less than those which we are obliged to quote."(3) The company argued in favour of the maintenance, as expressed in tariff item 208t, of the differential rates of duty under the B.P. and M.F.N. Tariffs. It said that the Industry Committee's proposal "would entirely eliminate this preferential margin, without at the same time conferring any benefit on Canadian manufacturers."(4) The company proposed that rates of Free, B.P. and 15 p.c., M.F.N. be recommended and that the preferential margin be maintained until this chemical is manufactured in Canada.

As noted under the phenols, cresols and xlenols, The Plywood Manufacturers Association of British Columbia recommended that the current rates of duty be retained for resorcinol.

Other Products of Heading 29.06

Pyrogalllic acid is used in small quantities in Canada in photographic work and in dyeing animal furs. Not made in Canada, but manufactured in the United Kingdom, the United States and Germany, it has been imported from the U.K. under tariff item 208t (Free, B.P. and 15 p.c., M.F.N.) in quantities ranging from about 3,600 to 9,700 pounds per year, worth approximately \$3 per pound. The two companies who made representations on this chemical, Prescott and Company and Johnsons of Hendon Limited, proposed that the preferential treatment accorded B.P. countries should be maintained and the latter company wished to see rates of Free, B.P. and 15 p.c., M.F.N. maintained.(5) The spokesman for the Industry Committee drew attention to the small volumes involved and said "This comes out to such a small amount of money that I would not raise any objection on principle to it, but I would very much doubt that it is deserving of separate tariff treatment."(6)

(1) Transcript, Vol. 52, p. 7974

(2) Same, Vol. 52, p. 7977

(3) Same, Vol. 52, p. 7983

(4) Same, Vol. 52, p. 7984

(5) Same, Vol. 52, p. 7991

(6) Same, Vol. 52, p. 7992

Lubrizol of Canada Limited listed calcium phenate, barium phenate, barium-calcium salt of organic phosphorus acid, and alkyl phenol in oil as chemicals under B.T.N. 29.06 in which the company is interested in connection with additives for heating, lubricating and fuel oils. At later hearings, in September 1962 and January 1963, the company recommended the "retention of classification of prepared additives for heating, lubricating and fuel oils under Tariff Item 711 with the rate of duty of B.P. 15 per cent, M.F.N. 20 per cent ...", and also the "retention of classification of materials to be used in the manufacture of additives when not made in Canada under Tariff Item 220e with the rate of duty B.P. free, M.F.N. 5 per cent ..." (1) As a means of accomplishing this objective, Lubrizol suggested the deletion of a tariff item based on heading 38.14 of the Brussels Nomenclature and the substitution of the following:

"38.14 Prepared additives for mineral oils
B.P. 15 per cent, M.F.N. 20 per cent

Sub group 1: Materials to be used in the preparation of additives for mineral oils when not made in Canada.
B.P. free, M.F.N. 5 per cent.
When made in Canada
B.P. 15 per cent, M.F.N. 20 per cent." (2)

Dibutyl phenol was one of a list of chemicals in which Ferro Enamels (Canada) Limited expressed an interest. It is currently imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. and the company requested that the chemical should be free of duty until ruled to be of a kind made in Canada, at which time it should be dutiable at 15 p.c., B.P. and 20 p.c., M.F.N. (3)

The Toilet Goods Manufacturing Association included Carvacrol on a list of chemicals for which the Association wished to have end-use provision similar to that under tariff item 264(a), which allows imports of essential oils at rates of Free, B.P. and $7\frac{1}{2}$ p.c., M.F.N. As previously noted, this item is not within the terms of Reference 120; separate provision, therefore, would have to be made either under the individual B.T.N. headings or by another end-use item.

In addition to the chemicals already dealt with in this part of the report, the Canadian Pharmaceutical Manufacturers Association submitted the following list of chemicals used by members in the manufacture of pharmaceutical products and for which it recommended that some end-use treatment be adopted. The Association recommended that rates of Free, B.P. and 15 p.c., M.F.N. should apply when they are not made in Canada and that the heading rates proposed by the Industry Committee (15 p.c., B.P. and 20 p.c., M.F.N.) apply when the products are made in Canada. All are currently imported at rates of Free, B.P., 15 p.c., M.F.N., under tariff item 208t. Of the chemicals in the list, only stilboestrol and cresol were regarded as more important chemicals:

(1) Transcript, Vol. 112, p. 16825-6

(2) Same, Vol. 112, p. 16826

(3) Same, Vol. 165, p. 24407

cresol
 dienoestrol
 hexoestrol
 4-n-hexylresorcinol
 stilboestrol
 thymol

The Industry Committee expressed the view that all the products of heading 29.06 which currently have commercial significance were dealt with in the submissions which the Board received for the hearing. The Committee recommended that all other products which might fall within the heading should be accorded the general heading rates, 15 p.c., B.P. and 20 p.c., M.F.N.

At the hearing on pesticides, in November 1962, a group of seven manufacturers of pesticides made a proposal concerning a list of biologically active materials, including phenyl phenol and its salts, for use in the manufacture of pesticide formulations. The companies were:

A.H. Howard Chemical Co. Ltd.	Orangeville, Ontario
Allied Chemical Services Ltd.	Calgary, Alberta
Chipman Chemicals Ltd.	Hamilton, Ontario
Gallowhur Chemicals Canada Ltd.	Lachine, Quebec
Manchester Products Ltd.	Galt, Ontario
Niagara Brand Chemicals	Burlington, Ontario
Green Cross Division	
Sherwin Williams Co. of	
Canada Ltd.	Montreal, Quebec

The companies proposed:

"The signatories of this brief share the view of the Chemical Industry Committee that, when a biologically active chemical, now on Appendix II, is made in Canada, it should become subject to the duty rates which have been recommended for the appropriate B.T.N. headings."(1)

The proposal was based on the belief that a duty on biologically active materials, not made in Canada, would increase the prices of pesticides to Canadian users without producing off-setting advantages for any segment of industry.

HALOGENATED, SULPHONATED, NITRATED OR NITROSATED DERIVATIVES
OF PHENOLS OR PHENOL-ALCOHOLS - B.T.N. 29.07

The Explanatory Notes to the Brussels Nomenclature divide the chemicals of this heading into four groups:

- (A) halogenated derivatives,
- (B) sulphonated derivatives,
- (C) nitrated derivatives, and
- (D) nitrosated derivatives.

The Industry Committee indicated that its submission was intended to have the same meaning as heading 29.07 in the Brussels Nomenclature, that is, organic chemicals "...derived from phenols and phenol-alcohols (Heading No. 29.06) by replacing one or more hydrogen atoms by a halogen (e.g. chlorine...), a sulphonic group ($-\text{SO}_3\text{H}$), a nitro group ($-\text{NO}_2$) or a nitroso group ($-\text{NO}$)."(1)

Submissions were heard on four specific products of this heading; one submission included ten more products, and the Industry Committee included four more on an end-use listing. The Committee stated its belief that "all the products of Heading No. 29.07 which currently have commercial significance are dealt with in the submissions...The Committee recommends that...other products be accorded tariff treatment by the classification and rates of duty provided for Heading 29.07."(2) The value of shipments of the products of this Heading was a very small part of the total value of Chapter 29, though some products do have significant use captively by the producing company.

2,4-Dichlorophenol

Dow Chemical of Canada Ltd. and Naugatuck Chemicals Division of Dominion Rubber Company Limited manufacture 2,4-dichlorophenol for captive use in the production of 2,4-dichlorophenoxyacetic acid, of which the esters and amines are herbicides (for weed killing and brush control). Three plants were in operation at the time of the hearing in 1961 and there were plans for a fourth.(3)

Dow Chemical of Canada Ltd., Fort Saskatchewan, Alberta
Naugatuck Chemical Division of Dominion Rubber Company Limited,
Elmira, Ontario
Clover Bar, Alberta
Interprovincial Co-operatives Limited, Saskatoon, Saskatchewan
(planned)

The spokesman for Dow Chemical stated, "Approximately 6 million pounds of 2,4-D acid equivalent were used in Canada in 1960... This would require approximately 4.8 million pounds of 2,4-dichlorophenol."(4)

(1) Transcript, Vol. 53, p. 7996

(2) Same, Vol. 53, p. 7996

(3) Same, Vol. 53, p. 7998, 8006

(4) Same, Vol. 53, p. 8003-4

No imports of 2,4-dichlorophenol as such were reported; no published price is available and it was said that no market price had been established. In the U.S.A., the published price was 40 cents per pound from 1957 until 1962, at which time it declined to 39.5 cents.

For use in the manufacture of herbicides, this chemical can be entered under tariff item 791, free of duty; for other uses, 2,4-dichlorophenol would be entered under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N.

Dow Chemical proposed that the heading rates suggested by the Industry Committee for heading 29.07, 15 p.c., B.P., 20 p.c., M.F.N., should apply to 2,4-dichlorophenol for all uses.⁽¹⁾ Naugatuck Chemicals Division of Dominion Rubber Company Limited noted that it would object to higher rates for its raw materials unless there was commensurate protection for its final products;⁽²⁾ that 2,4-dichlorophenol is an intermediate material, and that the end-product, for agricultural purposes, could enter duty-free. Generally, Naugatuck's proposals would support the rates recorded by the Industry Committee, namely 15 p.c., B.P. and 20 p.c., M.F.N.⁽³⁾

Pentachlorophenol

Dow Chemical of Canada Ltd. and Naugatuck Chemical Division of Dominion Rubber Company Limited submitted briefs on pentachlorophenol which they produce in Alberta at Fort Saskatchewan and Clover Bar, respectively. Both plants were new in 1961 (at the time of the hearing) and some of the equipment could be used alternatively to make dichlorophenol. The commercial product consists of dark coloured flakes and sublimed needle crystals of at least 86 per cent purity; approximately ten per cent by weight is of other chlorinated phenols so that active ingredients total 96 per cent.

The Canadian market, mainly for anti-fungus pressure treatment of wooden poles, railway cross-ties, fence posts, cross-arms and lumber generally, was supplied until 1961 by imports, mostly from the U.S.A. and France. Some of the market was said to be for bactericide, algicide, and herbicide, or for the production of such compounds. Estimates of consumption ranged between 1.5 million and 2.5 to 3 million pounds per year. Prior to September, 1960, pentachlorophenol from four United States producers was priced at 21 cents a pound at their factories.⁽⁴⁾ At that time these producers lowered the price to Eastern Canada and Vancouver to 20.6 cents (U.S.) per pound and raised the price in the Prairie Provinces to 21.6 cents (U.S.) per pound, delivered. Following the start of Canadian production the price in Canada appears to be about the same, 21 cents per pound in carload lots at the factory.

Creosote was named as the principal competitive material, followed by sodium pentachlorophenol and some unnamed inorganic salts.

(1) Transcript, Vol. 53, p. 8000

(2) Same, Vol. 53, p. 8006

(3) Same, Vol. 53, p. 8009

(4) Same, Vol. 53, p. 8022 and following

Imports of pentachlorophenol as fungicides may be entered free of duty under item 219a(2) from both British preferential and most-favoured-nation sources, and as a raw material for the manufacture of pesticides, free of duty under item 791. For other uses it would be dutiable under item 711 at 15 p.c., B.P., 20 p.c., M.F.N. Both manufacturers supported the Industry Committee's suggested heading rates for 29.07, namely 15 p.c., B.P. and 20 p.c., M.F.N., for pentachlorophenol. No opposition was heard.

Nitrophenols and Sodium Pentachlorophenate

These are fungicides used by leather tanners to produce mould-resistant leather. Neither of them was ruled made in Canada in 1961 at the time of the hearing, but sodium pentachlorophenate is now so ruled. There are three isomers of nitrophenol: ortho, meta and para, none of which is made in Canada. Besides its fungicidal use, sodium pentachlorophenate is said to be used in the manufacture of slimicides and pesticides.

The Leather Tanners Association of Canada, on behalf of its members, claimed there was no satisfactory substitute for these fungicides, and that to keep manufacturing costs low in competition with imported leather goods, its members required low duties on supplies.

In 1961, both chemicals were entered under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. Both may be entered duty-free under tariff items 791 and 219a(ii) when for fungicidal use. Sodium pentachlorophenate is now otherwise dutiable under item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. On behalf of its members, the Tanners Association of Canada sought free entry "until such time as the products are made in Canada."⁽¹⁾ No discussion arose regarding these proposals, but it should be noted that a proposal by the Canadian Pulp and Paper Association listed "chlorophenates", used as slimicides, among other process materials for which its members sought no increase over current tariff rates.⁽²⁾

Monosulphonic Acid Pulp

This blue pigment, used in the manufacture of toners for printing ink, is not made in Canada. The importer, Standard Ultramarine and Color Company Limited of Toronto, indicated that an alternative name for the product is "2-naphthol-7-sulphonic acid", an example listed under Brussels heading 29.07.⁽³⁾ The Industry Committee spokesman pointed out that this "pulp" was a complex synthetic organic pigment dyestuff, correctly classified under heading 32.05.⁽⁴⁾ The Standard Ultramarine and Color Company, Huntingdon, Virginia, on behalf of its Canadian subsidiary, submitted a brief which is discussed under heading 32.05 in this report.

(1) Transcript, Vol. 53, p. 8034-5

(2) Same, Vol. 36, p. 5245-6

(3) Same, Vol. 53, p. 8038-9

(4) Same, Vol. 53, p. 8036

Other Chemicals of B.T.N. 29.07

The potassium salt of 2,4,6-trichlorophenol, a slimicide, was mentioned at the hearing on 29.07 but, because it is not, generally, a single identifiable chemical, the product was considered to be more appropriately classified as a mixture under heading 38.19.

The following ten chemicals, not made in Canada, were listed by the Canadian Pharmaceutical Manufacturers Association as raw materials. The Association made a proposal including these chemicals as materials used by the pharmaceutical industry, for the most part of minor importance to its members, but including two more important chemicals, marked by an asterisk. The Association suggested rates of Free, B.P. and 15 p.c., M.F.N. "when not made in Canada and not otherwise provided for" but, when made in Canada, taking the heading rates suggested by the Industry Committee, 15 p.c., B.P., 20 p.c., M.F.N.⁽¹⁾

4-Chloro-o-cresol (-OH=1)
 4-Chloro-3:5-xylenol
 6-Chlorothymol
 Dichlorophen *
 Hexachlorophene *
 m-Iodophenol
 o-Iodophenol
 Sodium phenol-p-sulphonate
 2:4:6-Trinitrophenol (picric acid)
 Zinc phenol-p-sulphonate

At the hearing on pesticides in November 1962, a group of seven manufacturers of pesticides made a proposal concerning a list of biologically active materials for use in the manufacture of pesticide formulations. The companies were:

A.H. Howard Chemical Co. Ltd.	Orangeville, Ontario
Allied Chemical Services Ltd.	Calgary, Alberta
Chipman Chemicals Ltd.	Hamilton, Ontario
Gallowhur Chemicals Canada Ltd.	Lachine, Quebec
Manchester Products Ltd.	Galt, Ontario
Niagara Brand Chemicals	Burlington, Ontario
Green Cross Division	
Sherwin-Williams Co. of Canada Ltd.	Montreal, Quebec

The companies proposed:

"The signatories of this brief share the view of the Chemical Industry Committee that, when a biologically active chemical, now on Appendix II, is made in Canada, it should become subject to the duty rates which have been recommended for the appropriate B.T.N. heading."⁽²⁾

⁽¹⁾ Transcript, Vol. 87, p. 13283

⁽²⁾ Same, Vol. 108, p. 16332-3

The proposal for continued free entry was based on the belief that a duty on biologically active materials not made in Canada would increase the prices of pesticides to Canadian users without producing off-setting advantages for any segment of industry. The products under the present heading are:

Dichlorophenyl benzene sulphonate
Dinex (2-cyclohexyl-4,6-dinitrophenol)
Dinoseb (2-(1-methyl-n-propyl)-4,6-dinitrophenol)
D.N.C. (dinitrocresol)

ETHERS, ETHER-ALCOHOLS, ETHER-PHENOLS, ETHER-ALCOHOL-PHENOLS, ALCOHOL PEROXIDES AND ETHER PEROXIDES, AND THEIR HALOGENATED, SULPHONATED, NITRATED OR NITROSATED DERIVATIVES - B.T.N. 29.08

The Brussels Nomenclature divides the chemicals of this heading into four groups:

- (A) - Ethers - these may be considered as alcohols or phenols in which the hydrogen atom of the hydroxyl group is replaced by a hydrocarbon radical.
- (B) - Ether alcohols - these are derived from polyhydric alcohols or phenol-alcohols by replacing the hydrogen of the phenolic hydroxyl group or one of the alcoholic hydroxyl groups by an alkyl or aryl radical.
- (C) - Ether-phenols - these are derived from dihydric phenols or phenol alcohols by replacing the hydrogen of the hydroxyl group or of one of the phenol hydroxyl groups by an alkyl or aryl radical.
- (D) - Alcohol peroxide and Ether peroxide -

The products under this heading are of relatively small importance in Canadian domestic sales and international trade, amounting in total to possibly three or four million dollars. For the most part these chemicals are used in food flavouring, perfumery, solvents, pharmaceuticals or synthetic rubber. Requests were made for reductions in the rates of duty on imports of guaiacol, potassium guaiacol sulphate and perfluorocyclic ether, which are not made in Canada. They are all currently imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. Duty-free entry under both Tariffs was requested for guaiacol by the Paint Varnish and Lacquer Association, while W.J. Bush and Company (Canada) Limited proposed that the rates of duty currently applied should not be changed as long as the chemical is not made in Canada. Both agreed that rates of 15 p.c., B.P. and 20 p.c., M.F.N. would be appropriate when guaiacol is made in Canada. The spokesman for the Industry Committee wondered whether such an unimportant chemical deserved separate treatment.

While Hoffman-La Roche Limited proposed rates of Free, B.P. and 15 p.c., M.F.N. for potassium guaiacol sulphate, the company expressed agreement with the proposal of the Canadian Pharmaceutical Manufacturers Association for free entry for the product when of a kind not made in Canada and when for use in the manufacture of pharmaceuticals.⁽¹⁾

Minnesota Mining and Manufacturing of Canada Limited, in presenting its case for perfluorocyclic ether, noted that its current use as a coolant in atomic reactors is extremely small; the company requested that it be admitted duty-free "as long as the chemical is not made in Canada and as long as it is not competitive with other products."⁽²⁾

⁽¹⁾ Transcript, Vol. 55, p. 8277

⁽²⁾ Same, Vol. 55, p. 8280

Ethyl ether, also known as sulphuric ether, is made in Canada by E.R. Squibb & Sons of Canada Limited. It is currently imported under tariff item 219d(2) at rates of Free, B.P. and 20 p.c., M.F.N. When for use in the manufacture of steroid derivatives, ethyl ether may be imported duty-free under tariff item 863. Squibb noted that the company's costs are higher than its competitors' costs in the U.S.A., chiefly because of the higher cost of ethyl alcohol, the principal element of cost. The company requested "that no reduction be made in the current tariff rates for ether U.S.P. for anaesthetic use and solvent ether N.F. which are currently covered by Tariff Item No. 219d(2)."(1) The company estimated that it supplied between 80 and 90 per cent of the market for anaesthetic ether and had capacity considerably in excess of Canadian requirements. The company's statements would indicate a total annual market of less than 400,000 pounds for anaesthetic and solvent ethers together.

A proposal for the continuation of tariff item 863 was made to the Board by Charles E. Frosst and Company in connection with ether U.S.P. and isopropyl ether which the company uses in the manufacture of steroid derivatives. The company stated that these chemicals are not made in Canada and went on to say that, since protection of Canadian industry is not involved, the cost of pharmaceutical chemicals made from them should not be subjected to an increase resulting from higher tariff rates. To the Industry Committee's suggestion that it would be better to permit these chemicals to enter duty-free for all uses, until made in Canada, rather than continue item 863, the company replied that such a procedure if extended to all chemicals entered under item 863, would involve the public listing of ingredients, the identity of which the company would not want to disclose. The spokesman for Charles E. Frosst agreed that made in Canada products that are freely available should not be imported duty-free.

Union Carbide Canada Limited submitted a proposal to the Board on the series of glycols and ethers listed below. The products are dutiable under item 711 at 15 p.c., B.P., 20 p.c., M.F.N., and these were the rates requested by Union Carbide. The chemicals are made by the company in a complex operation in its Montreal East plant, and the company spokesman pointed out the difficulty of attempting to assess rates of duty individually for each chemical produced in such an operation.

The list of chemicals included in the proposal by Union Carbide Canada Limited is as follows:

diethylene glycol
triethylene glycol
ethylene glycol monomethyl ether
ethylene glycol monoethyl ether
ethylene glycol monobutyl ether
diethylene glycol monomethyl ether
diethylene glycol monoethyl ether
diethylene glycol monobutyl ether
triethylene glycol monomethyl ether
triethylene glycol monoethyl ether
triethylene glycol monobutyl ether

(1) Transcript, Vol. 54, p. 8105

These chemicals are used as solvents, in oil refining and dehydrating natural gas, in making synthetic resins, printing inks, paints and varnishes, brake fluids, as humectants in tobacco and in pharmaceuticals.

Union Carbide noted the need for adequate rates of duty for all the products produced in its complex, saying: "We must be able to dispose of the full line of these products at a profit. Business lost to imports on any single product automatically increases our cost on the rest."⁽¹⁾ The company wished to ensure itself of the total Canadian market. Although it was said to have 90 per cent of the market under the rates of duty then prevailing on some of the products (15 p.c.) on imports from the United States, the company maintained that this rate did not yield a satisfactory margin of profit. Higher duties would permit the company to raise prices, but "we would still endeavour to price our product to maximize the market that we supply so that we would obtain the total Canadian market and to the greatest extent possible cut off imports by the pricing of products."⁽²⁾ Prices in Canada were said to be higher than those in the U.S.A. reflecting in part the duty prevailing. Imports were about equal to exports, amounting to some 10 per cent of Canadian consumption. Union Carbide said that it was the only Canadian producer of the nine ethers, but Dow Chemical of Canada Limited also produces the two glycols and dichloroethyl ether. Of the last-named, however, Dow Chemical said that it is produced as a by-product in the manufacture of ethylene glycol, and it is not separated or purified because no commercial use has been found for it in Canada. No change in the rates of duty from the 15 p.c., B.P. and 20 p.c., M.F.N., currently in effect, was requested.

Dow Chemical said that diethylene glycol and triethylene glycol are made by the company as by-products in the manufacture of ethylene glycol at its plants at Sarnia, Ontario and Fort Saskatchewan, Alberta. A major portion of the diethylene glycol is used captively by the company for the manufacture of anti-freeze preparations; sales are to the natural gas industry to dehydrate natural gas streams, and to resin manufacturers as an intermediate in the production of polyester resins; diethylene glycol has some uses in textile lubricants, cutting oils and as a solvent for dyes. Another grade of diethylene glycol, the UDEX grade, is used as an extraction solvent for the recovery of petroleum aromatics. Triethylene glycol is used mainly in dehydrating natural gas streams. The company proposed that these glycols be subject to rates of duty of 15 p.c., B.P. and 20 p.c., M.F.N., though Dow Chemical considered the imports (and exports) of diethylene glycol to be negligible.

Prices in Canada were reported to be somewhat higher than in the U.S.A.; in tank car or tank truck lots, at the time of the hearing, they were generally 17½ cents per pound in Canada full freight allowed, compared with 15½ or 16½ cents in the U.S.A.⁽³⁾ The price for resin manufacture was said to take account of the fact that the duty on the resins is only 5 per cent (item 901(a)), and the price of diethylene glycol to resin manufacturers was, in effect, the U.S. price. Triethylene glycol prices were somewhat higher, 21½ cents per pound in Canada compared with 18½ cents in the U.S.A., tank cars or tank trucks, full freight allowed.

(1) Transcript, Vol. 54, p. 8159

(2) Same, Vol. 54, p. 8185

(3) Same, Vol. 55, p. 8241

Another glycol, dipropylene glycol, which occurs as an unavoidable co-product in the production of monopropylene glycol, was brought to the Board's attention by Canadian Chemical Company Limited, the sole Canadian manufacturer. It is produced in only modest quantities; there are no exports: imports were reported to be valued at \$75,000 in 1962 and \$50,000 in 1963. At the time of the hearing in September 1961, it was imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. although the company said "the bulk of the imports are probably classified under Tariff Item 921 at 0% and 0% M.F.N."(1) It has since been ruled made-in-Canada and is dutiable under item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N.; this change would preclude entries under tariff item 921.

Although cumene hydroperoxide occurs mostly as a transient chemical during the manufacture of phenol and acetone and is usually not recovered in this process, it can be separated. About one hundredth of one per cent was said to be so separated and sold for use as a catalyst; the remainder is used captively by Shawinigan Chemicals Limited in the operations formerly under B.A.-Shawinigan Limited. It is currently dutiable under tariff item 711 at 15 p.c., B.P. and 20 p.c., M.F.N., and B.A.-Shawinigan wished to perpetuate these rates of duty to prevent imports which could be used to make phenol and acetone in competition with the company's product.

W.J. Bush and Company (Canada) Limited and its United Kingdom parent company, W.J. Bush and Company Limited, submitted to the Board two lists of chemicals in which they were interested. Of these chemicals the spokesman for the Industry Committee said "there is no indication in either of these submissions as to whether there is a sufficient interest to warrant separate treatment."(2) These products are used in the preparation of compounds for the flavouring and perfumery industry, except that anisole is used as a chemical intermediate in the preparation of a pharmaceutical. Not made in Canada, some are imported from the U.K. under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N., though some, as noted with an asterisk below, may be imported as essential oils at rates of Free, B.P., $7\frac{1}{2}$ p.c., M.F.N., under tariff item 264a. This item is not part of Reference 120. The company requested that these rates of duty should be continued until the chemicals are made in Canada, at which time rates of 15 p.c., B.P. and 20 p.c., M.F.N. could be applied. The chemicals are as follows:

- * iso-eugenol
- dimethyl hydroquinone
- guaiacol
- * 5-propenyl guaethol
- * anethole
- anisole
- * anisyl alcohol
- p-cresyl methyl ether
- dibenzyl ether
- ethyl iso eugenol ether
- * eucalyptol
- * eugenol
- a-glyceryl guaiacol ether
- * methyl iso eugenol

(1) Transcript, Vol. 55, p. 8257

(2) Same, Vol. 55, p. 8304

Canadian Aniline and Extract Company Limited submitted a brief on a family of alkyl phenol polyethoxyethanols. The company's presentation concerned the chemical tariff more generally than proposals for separate products, saying:

"Brussels heading 29.08 represents one of the most all-embracing headings under review, which can be taken as an excellent example to illustrate the complexity and versatility of organic chemicals. Many of the chemicals found under this heading are chemically different whilst at the same time they exhibit parallel properties which make them highly competitive on the commercial market."(1)

The company's brief noted that, contrary to the belief that large production units are essential to efficiency, if such units cannot be operated at design capacity they are frequently more a liability than an asset. On the other hand, a plant designed to produce a multiplicity of products on a batch basis, thus obtaining "an accumulative production comparable with that of a single product plant operating on a continuous system"(2) is not as subject to changes in demand for a single product. The brief continued:

"however, such plants as these must be operated at maximum capacities to insure optimum efficiency. For this reason every effort should be made to encourage a market for a broad range of chemicals rather than attempt to set up a chemical schedule based on individual chemical recognition."(3)

This company proposed tariff rates of 15 p.c., B.P. and 20 p.c., M.F.N., noting that "If we have the overall protection of 20 per cent, then we can afford to carry through another product where we should be getting 50, but we have the reserve in the other production to carry it ..."(4)

Chemical Developments of Canada Limited submitted a brief to the Board on a family of chemicals which "would fall under this heading were it not for the distinction between separate chemical products and mixtures set up by the Brussels classification system."(5) Mixtures of the chemicals are used for surface-active agents and are dealt with under heading 34.02. The company said that "at present (and in the foreseeable future) no ethylene oxide based surfactants qualify as chemically defined products ..."(6) The chemical group in which Chemical Developments were interested is similar to those discussed by Canadian Aniline and Extract Company Limited. Chemical Developments recommended that chemically defined substances which are surface-active agents should receive the same tariff treatment as the surface-active agents of heading 34.02.

(1) Transcript, Vol. 55, p. 8313

(2) Same, Vol. 55, p. 8329

(3) Same, Vol. 55, p. 8329

(4) Same, Vol. 55, p. 8317

(5) Same, Vol. 55, p. 8353

(6) Same, Vol. 55, p. 8356

The Procter and Gamble Company of Canada Limited withdrew its brief on lauryl chloroglyceryl ether because its interest in the chemical has ceased. The company had requested that it be imported free of duty; with the withdrawal of the proposal, the Industry Committee proposed rates of duty of 15 p.c., B.P. and 20 p.c., M.F.N., its general residual provision.

Shawinigan Chemicals Limited made a statement on di-pentaerythritol and tri-pentaerythritol "just to round out the picture" on pentaerythritol. These were said to be minor materials, by-products that occur in the operation. The Industry Committee recommended that they be given the same rates of duty, 15 p.c., B.P. and 20 p.c., M.F.N., as apply to pentaerythritol.

The Canadian Pharmaceutical Manufacturers Association submitted to the Board a list of chemicals used by its members in the manufacture of pharmaceutical products and recommended that some end-use treatment be adopted for these chemicals when for use in the manufacture of pharmaceuticals. The Association recommended that rates of Free, B.P. and 15 p.c., M.F.N. should apply when they are not made in Canada and that the heading rates proposed by the Industry Committee (15 p.c., B.P. and 20 p.c., M.F.N.) apply when the products are made in Canada. The list of chemicals in the present heading, in addition to potassium guaiacol sulphonate noted above, to which this proposal applies, is as follows: potassium guaiacol sulphonate and mephenesin were listed as more important products to members of the Association. All are imported under tariff item 208t at rates of Free, B.P., 15 p.c., M.F.N.

1-n-butoxypropan-2-ol
 cineole
 1:2-diethoxyethane
 1:4-dioxan
 mephenesin
 2-phenoxyethanol

The Toilet Goods Manufacturers Association submitted a list of chemicals which it reported dutiable as essential oils under tariff item 264a which provides for rates of Free, B.P. and $7\frac{1}{2}$ p.c., M.F.N. The Association recommended that the "n.o.p." provision be removed from this item or suggested that a recommendation of similar intent be made by the Board, to prevent loss of end-use treatment for these chemicals. The Association expressed an interest, in addition to that in anethole, anisole, anisyl alcohol, cineole and eugenol noted above and musk ambrette mentioned under heading 29.03, in the following products:

p-cresol methyl ether
 diphenyl oxide
 isoeugenol
 methyl para cresol ether
 nerolin
 yara yara

At the hearing on pesticides, in November 1962, a group of seven manufacturers of pesticides made a proposal concerning a list of biologically active materials, among them methoxychlor, for use in the manufacture of pesticide formulations. The companies were:

A.H. Howard Chemical Co. Ltd.	Orangeville, Ontario
Allied Chemical Services Ltd.	Calgary, Alberta
Chipman Chemicals Ltd.	Hamilton, Ontario
Gallowhur Chemicals Canada Ltd.	Lachine, Quebec
Manchester Products Ltd.	Galt, Ontario
Niagara Brand Chemicals	Burlington, Ontario
Green Cross Division	
Sherwin Williams Co. of	
Canada Ltd.	Montreal, Quebec

The companies proposed:

"The signatories of this brief share the view of the Chemical Industry Committee that, when a biologically active chemical now on Appendix II, is made in Canada, it should become subject to the duty rates which have been recommended for the appropriate B.T.N. heading."⁽¹⁾

The proposal was based on the belief that a duty on biologically active materials, not made in Canada, would increase the prices of pesticides to Canadian users without producing off-setting advantages for any segment of industry.

Ferro Enamels (Canada) Limited submitted a proposal concerning tripropylene glycol methyl ether which it uses as a raw material in the manufacture of stabilizers for vinyl type resins. It is not made in Canada and is imported under tariff item 208t at rates of Free, B.P., 15 p.c., M.F.N. The company proposed that the product "should be subject to free entry" but also proposed that it be subject to rates of 15 p.c., B.P., 20 p.c., M.F.N. when held to be of a kind made in Canada.⁽²⁾

The Industry Committee expressed the view that all the products which currently had commercial importance were dealt with in the submissions which the Board had received for this hearing. The Committee recommended that other products should be accorded tariff treatment of 15 p.c., B.P. and 20 p.c., M.F.N. under a general heading provision.

(1) Transcript, Vol. 108, p. 16332

(2) Same, Vol. 165, p. 24408

EPOXIDES, EPOXYALCOHOLS, EPOXYPHENOLS AND EPOXYETHERS, WITH A
THREE OR FOUR MEMBER RING, AND THEIR HALOGENATED, SULPHONATED,
NITRATED OR NITROSATED DERIVATIVES - B.T.N. 29.09

The Industry Committee, in its general proposal, stated that heading 29.09 was intended to have the same meaning as in the Brussels Nomenclature and apply only to chemicals with one oxygen and two or three carbon atoms forming a ring. The Committee considered that all products of this heading which had commercial importance at the time of the public hearing in 1961 were dealt with in submissions received. Products of the heading other than these, the Committee proposed, should be accorded the rates of duty provided for heading 29.09 which, by the Committee's recommendation, would be 15 p.c., B.P., 20 p.c., M.F.N.

Ethylene Oxide

Dow Chemical of Canada, Limited, at Sarnia, Ontario and Union Carbide Canada Limited, Chemicals and Plastics Division in Montreal East, Quebec are the only Canadian manufacturers of ethylene oxide. The oxide is a clear, colourless, volatile, flammable liquid with a chemical formula C_2H_4O .

The chlorohydrin process, used by Dow Chemical, makes ethylene chlorohydrin from ethylene, chlorine and water, then reacts the chlorohydrin with an alkali to produce ethylene oxide. The method used by Union Carbide is to oxidize ethylene in air over a silver catalyst.

Plant capacity cannot be publicly disclosed but, in the opinion of both producers, there was sufficient Canadian capacity to supply the entire Canadian market for ethylene oxide.⁽¹⁾ Factory shipments in 1964 were reported to be 115 million pounds which, at prevailing market prices, would have a value of the order of \$17 million. The major use of ethylene oxide is captive to the two producers, for the manufacture of ethylene glycol and other glycols and ethanalamines. Besides the captive use, ethylene oxide is sold to soap and detergent manufacturers to ethoxylate fatty alcohols, and to manufacturers of "alkyl phenol-ethylene oxide adducts" for surfactants in the petroleum, industrial cleaning, and pulp-and-paper industries. Alone or mixed with carbon dioxide, it is used in the vault fumigation of stored foods or for sterilization. Captive use, besides the above-mentioned glycols, includes the manufacture of synthetic lubricants, brake fluids, and anti-stall additives for motor fuel.

Imports of ethylene oxide in the years from 1956 to 1959 were reported to be generally \$3 to \$6 million annually, except in 1958 when imports were only \$360,000. In more recent years the value of imports has been considerably less; in 1962, the reported value of imports was \$270,000 and in 1963, \$190,000. Prices in Canada, in 1961, tank car lots, full freight allowed east of British Columbia, rose from 16½ cents a pound to 17 cents a pound; for any use which benefitted from a duty-free tariff provision, the price was lowered from 15½ to 14 cents

(1) Transcript, Vol. 54, p. 8180; Vol. 55, p. 8221

per pound in the same period.⁽¹⁾ In 1964 the reported price of ethylene oxide in the U.S.A. was 15½ cents per pound, delivered in the eastern states, about what it had been in 1961.⁽²⁾ The published price in Canada was 16 cents per pound from 1962 to mid-1965.

Ethylene oxide is dutiable under tariff item 711 at 15 p.c., B.P. and 20 p.c., M.F.N., or duty-free under item 219e, for use in combatting destructive insects and pests. The two manufacturers proposed rates for ethylene oxide of 15 p.c., B.P. and 20 p.c., M.F.N. This was opposed by the National Farmers Union and the Canadian Federation of Agriculture in hearings on the general subject of pesticides. Both opposed any increase from the free entry applicable under item 219e.⁽³⁾ The submission by the Canadian Pharmaceutical Manufacturers Association included ethylene oxide in the proposal for an end-use item to provide for materials for use in the manufacture of pharmaceutical products. However, because ethylene oxide is made in Canada, the Pharmaceutical Manufacturers Association's proposal was also for rates of 15 p.c., B.P., 20 p.c., M.F.N.

Propylene Oxide

The Canadian Chemical Company Limited, at the time of the hearing in 1961, made propylene oxide for captive use in the manufacture of propylene glycol and dipropylene glycol.⁽⁴⁾ Dow Chemical of Canada Limited was building a plant at Sarnia to produce propylene oxide by the chlorohydrin process. Unavoidable co-products of the latter plant would be dipropylene glycol and tripropylene glycol of B.T.N. 29.08.

The 1964 price in the United States was 14½ cents per pound in tank cars, delivered. In 1965, the published price in Canada was 17½ cents a pound. Imports, though low, tripled from 1961 to 1962 and increased again the following year, at which time they amounted to \$280,000.

Propylene oxide was not offered for sale at the time of the hearing and there was no "made in Canada" ruling until May 4, 1964: at that time it became dutiable under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. This item provides the rates requested for this product by Dow Chemical.

Polyethylene Oxide

Only brief mention of polyethylene oxide was made, by the Canadian Pulp and Paper Association. It is used in the manufacture of polyethylene coated kraft but no data concerning its classification imports, exports, consumption or price were given. The Industry Committee, in expressing uncertainty about the correct classification of this chemical, said that polyethylene oxide is polyethylene glycol with

(1) Transcript, Vol. 55, p. 8222-3

(2) Oil, Paint and Drug Reporter

(3) Transcript, Vol. 107, p. 16248; Vol. 110, p. 16632

(4) Same, Vol. 55, p. 8381

a molecular weight exceeding 200,000 and suggested that a more appropriate classification might be heading 38.19.(1) Generally, the Pulp and Paper Association asked for "no increase of current rates of duty", but did not mention what rates currently apply to this material. The product is understood to be dutiable under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N.

Epichlorohydrin and Butyl Glycidyl Ether

Neither epichlorohydrin nor butyl glycidyl ether is made in Canada; the latter may be obtained from the former by reaction with butyl alcohol in the presence of an alkali. Union Carbide Canada Limited (Bakelite Division) and Shell Oil Company of Canada Limited import epichlorohydrin for the manufacture of epoxy resins. The former also imports butyl glycidyl ether for the same purpose. Half a pound of epichlorohydrin was said to be required for the production of a pound of epoxy resin and epichlorohydrin is the main raw material cost in epoxy resins. Imports of epichlorohydrin were valued at \$425,000 in 1963.(2) Both Canadian users apparently buy these materials from their associate companies in the United States. Europe is an alternative source. The published U.S. price in 1965 was 27 cents a pound.

For use in resins, both materials may be entered into Canada duty-free under tariff item 92L. For all other purposes, item 208t applies, with rates of Free, B.P., 15 p.c., M.F.N. Because the principal end-products, epoxy resins, enter Canada duty-free, and because Canadian producers of the resins compete against U.S. suppliers, free entry for epichlorohydrin was proposed by Shell Oil Company of Canada, Limited, and for both epichlorohydrin and butyl glycidyl ether by the Bakelite Division of Union Carbide Canada Limited.(3)

The Industry Committee agreed with the latter proposal until the products are available from Canadian production. The Canadian Paint Varnish and Lacquer Association supported free entry for epichlorohydrin "until made in Canada."(4) There were no objections to these proposals.

Lauryl Glycidyl Ether

The Procter and Gamble Company of Canada Limited, an importer of a coconut oil surfactant derived from lauryl glycidyl ether, submitted a brief on this product. Some classification doubt arose when it was described as a mixture of lauryl and myristyl glycidyl ethers. If it is a mixture, the product likely would be classified under B.T.N. heading 38.19; if it occurred as a single chemical, it would be classified in heading 29.09. The spokesman for the company said that he expressed no real preference in the matter of classification. Concerning lauryl glycidyl ether sulphonate, the derivative of the material in

(1) Transcript, Vol. 56, p. 8440

(2) Department of Trade and Commerce, Chemical Import Trends, 1963 Supplement, p. 14

(3) Transcript, Vol. 56, p. 8429, 8418

(4) Same, Vol. 93, p. 14172

question, he stated, "The installation of facilities to manufacture this surfactant in Canada will be feasible and economically attractive within several years provided that we can import the lauryl glycidyl ether duty free."⁽¹⁾

Procter and Gamble proposed that, until such time as lauryl glycidyl ether is made in Canada, it should be permitted duty-free entry under both the B.P. and M.F.N. Tariffs. If made in Canada, however, it would be expected to attract the heading rates for B.T.N. 29.09; rates of 15 p.c., B.P., 20 p.c., M.F.N. had been proposed. The company spokesman accepted the Industry Committee's criteria under which a commercial mixture of the named ether and myristyl glycidyl ether would be classified under heading 38.19..

Dieldrin and Endrin

Dieldrin and endrin, classified by this heading, are imported by Shell Oil Company of Canada, Limited from an associated company in the United States.⁽²⁾ The products are both used in formulation of that company's brand-name pesticides and for re-sale to other formulators. Shipments of dieldrin were reported to be 600 tons in 1963 and, in 1964, 130 tons.

Imports may be entered duty-free under tariff item 791, and the importer and formulators agreed that these products should continue to enjoy free entry. The subject of pesticides is discussed in this report, under Brussels heading 38.11.

At the hearing on pesticides, in November 1962, a group of seven manufacturers of pesticides made a proposal concerning a list of biologically active materials for use in the manufacture of pesticide formulations, among which were dieldrin and endrin. The companies were:

A.H. Howard Chemical Co. Ltd.
Allied Chemical Services Ltd.
Chipman Chemicals Ltd.
Gallowhur Chemicals Canada Ltd.
Manchester Products Ltd.
Niagara Brand Chemicals
Green Cross Division
Sherwin Williams Co. of
Canada Ltd.

Orangeville, Ontario
Calgary, Alberta
Hamilton, Ontario
Lachine, Quebec
Galt, Ontario
Burlington, Ontario

Montreal, Quebec

The companies proposed:

"The signatories of this brief share the view of the Chemical Industry Committee that, when a biologically active chemical, now on Appendix II, is made in Canada, it should become subject to the duty rates which have been recommended for the appropriate B.T.N. heading."⁽³⁾

(1) Transcript, Vol. 56, p. 8431

(2) Same, Vol. 109, p. 16556

(3) Same, Vol. 108, p. 16332-3

The proposal was based on the belief that a duty on biologically active materials, not made in Canada, would increase the prices of pesticides to Canadian users without producing off-setting advantages for any segment of industry.

ACETALS AND HEMIACETALS AND SINGLE OR COMPLEX OXYGEN-FUNCTION
ACETALS AND HEMIACETALS, AND THEIR HALOGENATED, SULPHONATED,
NITRATED OR NITROSATED DERIVATIVES - B.T.N. 29.10

The Explanatory Notes to the Brussels Nomenclature, 1955, divide the heading into two parts: (A) the acetals and hemiacetals, and (B) their halogenated, sulphonated, nitrated or nitrosated derivatives. The Industry Committee stated that its interpretation of the meaning of this heading agreed with the interpretation in the Explanatory Notes. The Committee stated further that for two chemicals an interest had been reported to the Committee, but for neither did the reporting company submit a specific recommendation to the Board. In the absence of any known chemicals of commercial importance, the Committee would propose the "heading classification and rates of duty as an appropriate tariff for all products in this category."⁽¹⁾ The Committee's proposal was for rates of 15 p.c., B.P., 20 p.c., M.F.N.

Safrole was listed, among other imported chemicals, by the Toilet Goods Manufacturers Association, as an essential oil for perfumery, entered under tariff item 264a at Free, B.P. and 7½ p.c., M.F.N. As with other materials, the Association proposed that these rates should continue in effect for safrole until such time as it is made in Canada,⁽²⁾ at which time rates of 15 p.c., B.P., 20 p.c., M.F.N. could apply. Item 264a is not part of Reference 120 - Chemicals.

Heliotropine sodium bisulphite (also known as piperonaldehyde sodium bisulphite)⁽³⁾ was the subject of representation by W.J. Bush and Co. (Canada) Ltd. under heading 29.05; it is discussed under that heading. Essentially, the company's position was that the product is not made in Canada; it is at present dutiable under tariff item 208t, Free, B.P., 15 p.c., M.F.N.; the company imports it from Britain, and requested that the existing rates of duty should continue at least until the product is made in Canada; at that time, rates of 15 p.c., B.P., 20 p.c., M.F.N. might apply.

Two products, methylal chloride (possibly a synonym for chloromethylal) and piperonyl butoxide were listed by the Industry Committee with other products in which parties had registered with the Committee some end-use interest. No representations on methylal chloride were made before the Board.⁽⁴⁾

At the hearing on pesticides, in November 1962, a group of seven manufacturers of pesticides made a proposal concerning a list of biologically active materials including piperonyl butoxide, for use in the manufacture of pesticide formulations. The companies were:

(1) Transcript, Vol. 56, p. 8442

(2) Same, Vol. 87, p. 13228

(3) Classification of Chemicals in the Brussels Nomenclature, 1961 (Revised, Jan., 1965), H.M.S.O., London

(4) Transcript, Vol. 56, p. 8442

A.H. Howard Chemical Co. Ltd.	Orangeville, Ontario
Allied Chemical Services Ltd.	Calgary, Alberta
Chipman Chemicals Ltd.	Hamilton, Ontario
Gallowhur Chemicals Canada Ltd.	Lachine, Quebec
Manchester Products Ltd.	Galt, Ontario
Niagara Brand Chemicals	Burlington, Ontario
Green Cross Division	
Sherwin Williams Co. of	
Canada Ltd.	Montreal, Quebec

The companies proposed:

"The signatories of this brief share the view of the Chemical Industry Committee that, when a biologically active chemical, now on Appendix II, is made in Canada, it should become subject to the duty rates which have been recommended for the appropriate B.T.N. heading."(1)

The proposal was based on the belief that a duty on biologically active materials, not made in Canada, would increase the prices of pesticides to Canadian users without producing off-setting advantages for any segment of industry.

(1) Transcript, Vol. 108, p. 16332-3

ALDEHYDES, ALDEHYDE-ALCOHOLS, ALDEHYDE-ETHERS, ALDEHYDE-PHENOLS
AND OTHER SINGLE OR COMPLEX OXYGEN-FUNCTION ALDEHYDES - B.T.N. 29.11

These are compounds formed by oxidizing primary alcohols. The Brussels Nomenclature recognizes three main groupings sub-divided as follows, with examples:

A. Aldehydes

- 1) Saturated acyclic aldehydes: formaldehyde (methanal), trioxymethylene (trioxan) and acetaldehyde (ethanal) which when polymerized gives paraldehyde, metaldehyde, butyraldehyde, heptaldehyde or caprylaldehyde.
- 2) Unsaturated acyclic aldehydes: acrylaldehyde, crotonaldehyde, citral and citronellaldehyde.
- 3) Cyclanic, cyclenic and cycloterpenic aldehydes: phellandral sepanol.
- 4) Aromatic aldehydes: benzaldehyde, cinnamaldehyde

B. Aldehyde-alcohols: aldol

C. Aldehyde ethers, aldehyde phenols and other complex oxygen-function aldehydes: Salicylaldehyde, anisaldehyde

The heading excludes aldehyde-bisulphite compounds which are classified under 29.04 and 29.10 as sulphonated derivatives of alcohols.

In 1962, the value of shipments of the chemicals of this heading amounted to about \$7 million, representing about 4 per cent of the shipments for the whole of B.T.N. Chapter 29. Shipments of formaldehyde and vanillin accounted for by far the largest part of the total. Shipments, however, do not reflect the full significance of products of the heading because of captive use by producers; some products gain almost their entire importance to such use; acetaldehyde, for example, is a very important chemical intermediate in which there is virtually no commercial trade.

Formaldehyde

The Product and Method of Manufacture

Formaldehyde, at ordinary temperatures and atmospheric pressure, is a colourless gas. It has a pungent, suffocating odour and is intensely irritating to the eyes, nose and throat. Very soluble in water, it reacts readily with many substances.

Because of its instability in the gaseous state, formaldehyde is marketed as a solution in water, but even in this form it is unstable and 7 to 10 per cent methanol is sometimes added to prevent polymerization to paraformaldehyde or to trioxane. Other inhibitors are also used although, "Much the biggest part of the formaldehyde shipped — the

tank car business — is uninhibited, there isn't any methanol in it."⁽¹⁾ The solution is commonly 37 per cent formaldehyde by weight, but one company in Canada markets a 46½ per cent solution. A solution of 37 per cent formaldehyde by weight is equivalent to the strength known as Formalin 40 per cent, a term which signifies that it contains 40 grams in 100 cubic centimeters of the solution.

Formaldehyde is made in Canada by two methods. In the first, used by Canadian Chemical Company Limited at Edmonton, Alberta, hydrocarbons consisting chiefly of propane and butane are mixed with oxygen at carefully controlled temperature and pressure and incompletely burned in a reaction of very short duration. In the resulting mixture are formaldehyde, acetaldehyde, acetone and methanol as well as other compounds of carbon, hydrogen and oxygen. This mixture is separated into two major streams by extraction with water, giving a dilute solution of formaldehyde and a residual stream containing the rest of the original mixture. The dilute formaldehyde solution is concentrated to a 20 per cent solution for use in making pentaerythritol, and to 37 per cent and 46½ per cent for sale. At the time of the hearing the spokesman for Union Carbide Canada Limited noted that "currently more than 50 per cent of the Canadian production of formaldehyde is produced by this method."⁽²⁾

In the second method, which yields essentially pure formaldehyde, methanol is vaporized and the vapour is oxidized in the presence of a catalyst. This method is used by all the companies listed below except Canadian Chemical Company.

The Industry

Information available to the Board indicates that formaldehyde is made in Canada by five companies:

- 1) Borden Chemicals (Canada) Limited, North Bay, Ontario
- 2) Canadian Chemical Company Limited, Edmonton, Alberta
- 3) Reichhold Chemicals (Canada) Limited, Port Moody, British Columbia and Ste. Therese, Quebec
- 4) Shawinigan Chemicals Limited, Varennes, Quebec
- 5) Union Carbide Canada Limited, Belleville, Ontario

The plants of Borden and Reichhold were not in operation at the time of the hearing in 1961, but were reported to have come on stream in 1963 or 1964.

The Market

As indicated in a later table, the use of formaldehyde in Canada has been increasing in recent years and most of the product consumed has been produced in this country.

⁽¹⁾ Transcript, Vol. 46, p. 6757

⁽²⁾ Same, Vol. 56, p. 8473

In Canada, the major uses for formaldehyde are in making pentaerythritol, phenolic resins and urea resins. Such minor uses as disinfecting seeds, fumigating and leather tanning consume about three per cent of the formaldehyde produced. It was estimated that some 40 per cent of production is for merchant sale, the balance being for captive use. The manufacture of pentaerythritol represents captive consumption, as does much of the resin manufacture.

Consumption of Formaldehyde, Known Uses
1960-1962

<u>Industrial Use</u>		<u>1960</u>	<u>1961</u>	<u>1962</u>
Paint and Varnish	lb.	233,496	356,724	417,540
Manufacture	\$	28,150	42,159	50,000
Manufacture of Plastics	lb.	16,806,103	18,833,179	21,848,403
and Synthetic Resins	\$	1,668,361	1,823,383	2,153,000
Manufacture of Indus-	lb.	857,759	701,746	997,127
trial Chemicals	\$	94,501	77,868	110,543
Misc. Chemical	lb.	537,022	1,957,538	2,033,103
Products	\$	<u>63,219</u>	<u>196,879</u>	<u>245,000</u>
Total of above	lb.	18,434,380	21,849,187	25,296,173
	\$	1,854,231	2,140,289	2,558,543

Source: D.B.S., various publications

The Canadian market appears to be divided between British Columbia and Alberta in the west and Ontario and Quebec in the east.⁽¹⁾ The western market is served, practically in its entirety, by Canadian Chemical Company with the 46½ per cent product which avoids the extra expense of shipping unnecessary water. The eastern part of the market is served chiefly by the other manufacturers whose plants are located in Ontario and Quebec and produce the 37 per cent formaldehyde. In its submission, Union Carbide Canada Limited estimated that some 189 million pounds of 37 per cent solution (the equivalent of 70 million pounds of 100 per cent formaldehyde) were produced in Canada in 1960. The estimate is an upward adjustment of data published by the Dominion Bureau of Statistics for that year, as shown in the following table.

(1) Transcript, Vol. 56, p. 8477

Production of Formaldehyde in Canada
1958-1964
 (100 per cent solids basis)

<u>Year</u>	<u>Production (Pounds)</u>
1958	45,271,299
1959	56,112,290
1960	58,282,160
1961	66,673,278
1962	79,607,435
1963	79,587,818
1964	100,107,908

Source: D.B.S., Specified Chemicals, Cat. No. 46-002

Formaldehyde is imported almost entirely from the United States and it has been exported to several countries. Imports and exports fluctuate because of shortage and excess, the product being too unstable to store for long periods of time. Imports were said by the spokesman for Canadian Chemicals to be entered mostly into the western market, with negligible quantities coming into the eastern market. The company said that western imports were made by a Canadian company affiliated with a producer in the State of Washington, U.S.A. In its presentation, the Canadian Chemical Company Limited showed that imports have exceeded exports from 1956 to 1961; exports ranged between 2.5 and 8 million pounds, and imports between 5.5 and 11 million pounds. The trade fluctuates from year to year, and no trend is evident in the available data.

Imports of Formaldehyde into Canada
1958-1964

<u>Year</u>	<u>Total</u>		<u>From United States</u>	
	<u>'000 lb. (a)</u>	<u>\$'000</u>	<u>'000 lb. (a)</u>	<u>\$'000</u>
1958	6,638	241	6,631	240
1959	4,414	154	4,414	154
1960	10,735	396	10,687	394
1961	6,530	276	6,530	276
1962	2,603	116	2,603	116
1963	5,531	264	5,531	264
1964	5,075	300	5,075	300

(a) These figures are not converted to 100 per cent formaldehyde basis. They are therefore not directly comparable to production data given in the preceding table.

Source: D.B.S., Trade of Canada, Cat. No. 65-007

The spokesman for Union Carbide Canada Limited noted that the Canadian price of formaldehyde is dominated by prices in the United States because imports enter Canada duty-free:

"Our price fluctuates immediately; we have to gear our price to the United States prices. There is no delay, it takes place immediately or we don't get the sale ..."(1)

The following table shows published prices of formaldehyde in Canada and the United States, but it does not reveal the lower prices that are actually paid by the large bulk buyers. It might be noted that the published Canadian prices advanced early in 1963, possibly reflecting the devaluation of the Canadian dollar.

Prices of Formaldehyde
Canada and the United States

<u>Year</u>	<u>37 per cent</u> <u>Uninhibited</u>		<u>per cwt.</u>	<u>44 per cent</u> <u>Uninhibited</u>	
	<u>Canada</u>	<u>U.S.A.</u>		<u>Canada</u>	<u>U.S.A.</u>
	Can. \$	U.S. \$ High		(Ont. & Que.) Can. \$	U.S. \$
1959	3.75	3.75		4.45	
1960	3.75	3.75		4.45	
1961	3.75	3.75		4.45	
1962	3.75	3.75		4.45	4.46
1963	3.90	3.75		4.65	4.46
1964	3.90	3.75		4.65	4.46
1965	3.90	3.75		4.65	4.46

- Tank Cars, delivered

- United States prices are for 44 per cent formaldehyde containing 1 per cent methanol. Canadian prices are for uninhibited formaldehyde

Source: Canadian Chemical Processing; Oil, Paint and Drug Reporter

Tariff Considerations

Formaldehyde is named in tariff item 219b, and it is believed that most imports are entered under that item, duty-free under all Tariffs. If a mixture contained more than 15 per cent of alcohol, it would be entered under item 220a(ii) where an additional duty is levied on the alcohol content. The Board understands that this provision has no appreciable commercial importance.

Representations concerning formaldehyde were made to the Board by four companies and one association:

(1) Transcript, Vol. 56, p. 8488

- 1) Canadian Chemical Company Limited, Edmonton, Alberta
- 2) Reichhold Chemicals (Canada) Limited, Weston, Ontario
- 3) Shawinigan Chemicals Limited, Montreal, Quebec
- 4) Union Carbide Canada Limited, Montreal, Quebec
- 5) Rubber Association of Canada

The Canadian Chemical Company, while apparently arguing the need for protection against foreign producers, made no actual proposal in its submissions. When discussing imports by a west coast resin producer from its affiliate in the U.S.A., the company said:

"This situation points up the fact that, in the absence of a tariff protection, even selling at the United States price will not assure the market for the Canadian manufacturer.

"Where a domestic user is affiliated with a foreign manufacturer the overall corporate interest may well be to import from the affiliate even though the product in question can be obtained at the same price from a Canadian source ... It does, however, indicate that a tariff can be necessary if a Canadian producer is to obtain the Canadian market even when selling at the U.S. price."(1)

Union Carbide Canada Limited requested that duty rates of 15 p.c., B.P. and 20 p.c., M.F.N. be applied against imports of formaldehyde. Shawinigan Chemicals Limited said that the company "would be quite content to have formaldehyde at duty rates of 15 per cent B.P., 20 per cent M.F.N. as is requested by other producers"; the company indicated that it could not logically request the duty on its own behalf because it was requesting duty-free entry on its raw material (methanol) and formaldehyde was some other company's raw material. Reichhold Chemicals (Canada) Limited said that it had no objection to the request for a duty of 20 per cent on the product because the company wanted similar treatment on the products it manufactures.(2) The Rubber Association said that "the rubber industry cannot afford to acquiesce in any tariff increases that would tend to raise the costs of its raw materials."(3)

It was estimated by Union Carbide that, in 1960, imports accounted for approximately 7 per cent of consumption; imports since that time have declined while domestic production has increased substantially, so that, by 1963 or 1964, imports undoubtedly supplied less than 5 per cent of the market in Canada.

Although the preponderant part of the domestic market is held by Canadian producers without benefit of protection from tariffs, Union Carbide noted that this is accomplished by having to "keep our price geared to the United States price."(4) No information was submitted to indicate that this pricing policy was unprofitable to the Canadian producers, but the implication seemed to be that manufacturers would raise their prices under the shelter of a protective tariff.

(1) Transcript, Vol. 56, p. 8462-3

(2) Same, Vol. 56, p. 8529

(3) Same, Vol. 57, p. 8646

(4) Same, Vol. 56, p. 8490

No reason was given for the proposed rate of 15 p.c. under the British Preferential Tariff, though rates of 15 p.c., B.P. and 20 p.c., M.F.N. were generally proposed by the industry for chemicals.

The Canadian Pharmaceutical Manufacturers Association included formaldehyde on a list of the more important chemicals used by its members in making pharmaceutical preparations. When these chemicals are not made in Canada, the Association proposed that they be entered, Free, B.P. and at 15 p.c., M.F.N., unless otherwise provided, when for use in the manufacture of pharmaceuticals. On the other hand, when they are made in Canada, the Association proposed rates of 15 p.c., B.P. and 20 p.c., M.F.N.

Acetaldehyde

Acetaldehyde is a colourless, mobile liquid with a suffocating odour. Mixtures of its vapour with air are highly flammable and explosive. Its highly reactive nature makes it useful as an important chemical building block.

It is produced in Canada by Canadian Chemical Company Limited, at Edmonton, Alberta, from a predominantly propane and butane hydrocarbon mixture in the same process that yields formaldehyde. At Varennes, Quebec, Shawinigan Chemicals Limited produce acetaldehyde by the direct oxidation of ethylene. This is the key operation in Shawinigan's Varennes complex as acetaldehyde is the starting point of many of Shawinigan Chemicals products. With the inauguration in 1963 of this method of making acetaldehyde, the plant at Shawinigan, Quebec, producing the chemical from calcium carbide, was reported to have been shut down. The capacity of the Varennes acetaldehyde installation is given by trade sources as 120 million pounds per year.⁽¹⁾ Shawinigan Chemicals reported that it produced acetaldehyde at the rate of tens of millions of pounds per year.⁽²⁾

Essentially all of the acetaldehyde produced in Canada is consumed by the two companies which make it. An analogous situation is said to prevail in the United States and in Europe. Although sales are not significant, Canadian Chemical Company Limited noted that the company would be prepared to negotiate sales with any user. There have been no imports and it has been only sporadically exported, to "help get a new plant into smooth running condition", by Canadian Chemicals to a related company in the United States.⁽³⁾

Acetaldehyde is used in the production of acetic acid, crotonaldehyde and pentaerythritol. Each of these is a very important chemical in its own right and, in this connection, Canadian Chemical Company said, "It is apparent, therefore, that acetaldehyde is a very basic chemical in our operations."⁽⁴⁾ No price data in Canada are available because it is not sold, but in the United States the price was said to be about 10 cents per pound.

(1) Oil, Paint and Drug Reporter, July 1, 1963

(2) Transcript, Vol. 57, p. 8657

(3) Same, Vol. 57, p. 8652

(4) Same, Vol. 57, p. 8648

Acetaldehyde is dutiable as an unenumerated article under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. Both of the producers proposed that these rates be continued. The product may also be entered duty-free under tariff items 791 and 851 if for use in the manufacture of pesticides and synthetic rubber respectively.

There was no expression of interest from users of acetaldehyde because practically all consumption is captive. It was agreed that the rate of duty is of little significance in protecting the manufacture of the products. In defence of protection, however, both companies noted the possibility of potential imports which might undermine their production of products coming later in the production chain. Canadian Chemical Company Limited said:

"There is nothing very pressing about it at the moment, that is quite right, and the nature of the product is such that we don't live in great fear of this happening, but our feeling is that the temptation should not be put in the way for people to come in and start with these intermediates when we have made the necessary investment to start at the base, with the raw materials ..."(1)

Shawinigan Chemicals Limited observed that:

"The importance of these materials dictates that they carry rates of 15 per cent, B.P., 20 per cent, M.F.N., in the future. In this way, the flank of our complex is protected. Without such protection it would be possible for someone to by-pass the basic stages of our complex. We therefore would be seriously concerned if any reduction were contemplated.

"On the other hand, the existing rates have appeared adequate and need not in our opinion be raised."(2)

Vanillin

Vanillin is produced in Canada from the waste sulphite liquor from pulp mills and used in perfumes, flavouring and pharmaceuticals. Statistics on production are not publicly available, but exports comprise a large proportion of shipments; in 1964, according to U.S. data, Canada exported more than 600,000 pounds of vanillin to the U.S.A., valued at \$1.4 million.

Exports of Vanillin to the U.S.A., 1959-1964

	<u>lb.</u>	<u>\$</u>
1959	102,209	282,088
1960	377,525	1,044,510
1961	326,350	959,423
1962	610,375	1,639,105
1963	853,300	1,930,666
1964	600,828	1,427,619

Source: U.S. Dept. of Commerce, Imports, s.c. 5120340

(1) Transcript, Vol. 57, p. 8651

(2) Same, Vol. 57, p. 8659

Imports, on the other hand, are of much smaller consequence; they are chiefly from the U.S.A.

Imports of Vanillin, 1959-1964

	<u>Total</u>		<u>Imports</u>	<u>Imports</u>	<u>Dutiable</u>
	<u>'000 lb.</u>	<u>\$'000</u>	<u>From U.K.</u>	<u>From U.S.A.</u>	<u>Imports</u>
			<u>\$'000</u>	<u>\$'000</u>	<u>\$'000</u>
1959	8.5	31.4	26.6	3.0	9.7
1960	4.5	16.8	13.0	0.8	8.4
1961	6.4	21.5	21.0	0.4	9.7
1962	63.6	159.5	13.1	146.4	147.6
1963	94.4	174.3	13.6	158.4	161.0
1964	43.9	107.6	37.3	48.8	..

Source: D.B.S., Trade of Canada, Imports, s.c. 8414

Since 1960, the average value of imports from the U.K., in the range of \$3.42 to \$4.60 per pound, has been substantially higher than the average value of those from the U.S.A., at \$1.59 to \$2.43. In 1964, imports from the U.K. were at their maximum average value, while those from the U.S.A. were at their minimum suggesting, as is noted below, products appreciably different in nature. The duty collected on imports from the U.K. has been 15 per cent of the dutiable value; on imports from the U.S.A. it has been about 20 per cent.

No representations were received from producers of vanillin in Canada. W.J. Bush and Company (Canada) Limited submitted a proposal on several chemicals, one of which was vanillin. The company said that the vanillin made in Canada, from lignin, is of a different type from that made by the parent company in England from clove oil. The spokesman for the Industry Committee noted that, in the absence of either the Canadian manufacturer or the representation of W.J. Bush, he could not "get into any discussion as to distinctions between the vanillin made in Canada and the type of vanillin which is imported." (1)

Since vanillin is made in Canada, W.J. Bush and Company (Canada) Limited recommended that imports be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N., the rates currently in effect under tariff item 711.

Pure vanillin is on the list of more important chemicals of interest to the Canadian Pharmaceutical Manufacturers Association; the end-use interest of the Association with respect to the list of products of heading 29.11 is presented later in this section of the report.

(1) Transcript, Vol. 57, p. 8688

Other Products of Heading 29.11

In addition to its recommendations on vanillin, W.J. Bush and Company (Canada) Limited submitted proposals on the following chemicals of heading 29.11:

benzaldehyde
cinnamaldehyde
citral
ethyl vanillin
hydroxycitronnellal
heliotropine
salicylaldehyde

The company noted that none of these chemicals is made in Canada but all are imported from its parent company in the U.K. The brief drew attention to the fact that vanillin and ethyl vanillin may be of the same class or kind because both have a vanilla-like flavour, but maintained that the chemicals are not interchangeable. It was suggested at the hearing that benzaldehyde, cinnamaldehyde and hydroxycitronnellal are considered to be essential oils and dutiable at rates of Free, B.P. and $7\frac{1}{2}$ p.c., M.F.N. under tariff item 264a, which is not in the terms of the Reference. Citral and salicylaldehyde may also be entered under item 264a. Benzaldehyde might also be imported duty-free under item 921 when for use in plastics. Ethyl vanillin and heliotropine are dutiable under tariff item 208t at rates of Free, B.P., 15 p.c., M.F.N. As single, identified chemicals they are classified by heading 29.11 of the Brussels Nomenclature.

W.J. Bush recommended that these chemicals should be dutiable under tariff item 208t, at rates of Free, B.P. and 15 p.c., M.F.N., until they are made in Canada. A. Boake, Roberts and Company Limited, which sells amyl cinnamic aldehyde, heliotropine and hydroxycitronnellal of high purity for use in perfuming cosmetics, soaps and detergents, also proposed rates of Free, B.P. and 15 p.c., M.F.N. for these chemicals.

Benzaldehyde, cinnamaldehyde and ethyl vanillin were on the list of chemicals of minor importance to its members, used in making pharmaceutical products, presented to the Board by the Canadian Pharmaceutical Manufacturers Association. The Association recommended that rates of Free, B.P., 15 p.c., M.F.N., should apply when they are not made in Canada, and that rates of 15 p.c., B.P. and 20 p.c., M.F.N., should apply when the products are made in Canada.

Benzaldehyde, cinnamaldehyde, citral, ethyl vanillin, and heliotropine were listed by the Toilet Goods Manufacturers Association among chemicals used by its members as raw materials. The Association recommended that the "n.o.p." provision of tariff item 264a, which is not in the Reference, be removed from the item or suggested that a recommendation of similar intent should be made by the Board to ensure that these materials are dutiable at the rates of item 264a, Free, B.P., $7\frac{1}{2}$ p.c., M.F.N.

Shawinigan Chemicals Limited submitted a brief to the Board on five other aldehydes which the company makes at Shawinigan, Quebec. These are:

acetaldol
crotonaldehyde
butyraldehyde
2-ethyl-3-propyl acrolein
2-ethylhex-2-enaldehyde

The company said that because these chemicals are highly reactive they are largely used "as major chemical building blocks by a few companies in large volume ... Essentially all our production of these aldehydes is consumed within the company or by associated companies." (1) They are used as intermediates in the manufacture of other chemicals, and produced "in the millions of pounds per year." One product, 2-ethyl-3-propyl acrolein was said to be not an article of commerce; it is not ruled made in Canada and is dutiable under item 208t at Free, B.P. and 15 p.c., M.F.N.; however, since the time of the hearing the product has been ruled made in Canada.

Shawinigan Chemicals proposed that the rates of duty on these chemicals should continue at 15 p.c., B.P. and 20 p.c., M.F.N., as at present under tariff item 711. The company's argument for these rates has been recited above under acetaldehyde. Such data as are available indicate that imports are of minor significance.

Shawinigan Chemicals noted that paraldehyde is simply a convenient form in which to ship acetaldehyde. It is currently imported under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. The company said that this duty "has discouraged large movements of acetaldehyde into Canada in this form and should be retained for the same reasons given above on acetaldehyde." (2) A refined grade of paraldehyde is made and marketed by McArthur Chemical Company Limited, a subsidiary of Shawinigan Chemicals Limited. The crude paraldehyde is provided by Shawinigan and refined by McArthur at Montreal. It is used in quantities of a few tons yearly as a hypnotic and a sedative, largely in mental hospitals. The subsidiary, McArthur Chemical, supported the proposal for retention of the existing rates.

The Canadian Chemical Company Limited submitted a brief on paraformaldehyde. This chemical is not made in Canada, but is imported for resale by the company. Paraformaldehyde is essentially formaldehyde from which water has been removed in a somewhat complex process, and is used for much the same purposes as aqueous formaldehyde. "For almost all uses paraformaldehyde and aqueous formaldehyde are directly competitive and the choice of the one or the other is pretty strictly a matter of money." (3) Imports were believed to be small, and well under one million pounds per year. Paraformaldehyde is dutiable under item 208t at rates of Free, B.P. and 15 p.c., M.F.N. However, for use in the manufacture of synthetic resins and certain plastic products, it would be free of duty under tariff item 921. For use in making pesticides it could be entered free of duty under item 791. Although Canadian Chemical Company made no specific proposal, the implication is that the company supports rates of 15 p.c., B.P. and 20 p.c., M.F.N. It said:

(1) Transcript, Vol. 57, p. 8657

(2) Same, Vol. 57, p. 8660

(3) Same, Vol. 57, p. 8670

"Paraformaldehyde is not within our complex and we have no proposal with respect to it and are aware of no one who has, and in our opinion it would automatically go under the heading rate."(1)

W.J. Bush and Company Limited submitted a list of chemicals not made in Canada and for which there was said to be no significant use in Canada. They may be imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N., and the company wished to have these rates of duty retained until the chemicals are made in Canada at which time rates of 15 p.c., B.P. and 20 p.c., M.F.N., could be applied. Some entries may also be made under item 264a at rates of Free, B.P., 7½ p.c., M.F.N. The chemicals are:

amyl cinnamic aldehyde
 anisaldehyde
 p-hydroxybenzaldehyde
 o-methoxybenzaldehyde
 p-methoxybenzaldehyde
 veratraldehyde

The Canadian Pharmaceutical Manufacturers Association submitted to the Board a list of chemicals used by its members in the manufacture of pharmaceutical products and recommended that some end-use treatment be adopted for these chemicals. The Association recommended that rates of Free, B.P. and 15 p.c., M.F.N., should apply when they are not made in Canada and that the heading rates proposed by the Industry Committee (15 p.c., B.P. and 20 p.c., M.F.N.) apply when the products are made in Canada. The list of chemicals to which this applies is as follows:

acraldehyde
 benzaldehyde
 cinnamaldehyde
 3-ethoxy-4-hydroxybenzaldehyde
 (ethyl vanillin)
 formaldehyde
 paraformaldehyde
 paraldehyde
 vanillin

The Toilet Goods Manufacturers Association listed a number of chemicals in which its members are interested. The Association was especially concerned about the status of the "n.o.p." provision in tariff item 264(a) under which the essential oils for perfumery are imported. The Association wishes to preserve the end-use treatment accorded by item 264(a) and recommended that the "n.o.p." provision be removed from the item or that the Board should make a recommendation of similar intent. The chemicals concerned are:

(1) Transcript, Vol. 57, p. 8672

caprylic aldehyde
pelargonaldehyde
capraldehyde
undecylenaldehyde
undecylic aldehyde
n-dodecylic aldehyde
methyl n-nonyl acetaldehyde
gamma-undecalactone peach aldehyde
alpha-pentylcinnamaldehyde
anisic aldehyde
cyclamen aldehyde
methyl nonyl acetaldehyde
phenyl acetaldehyde
trimethyl undecylic aldehyde

The Industry Committee noted that all chemicals of heading 29.11 which currently have commercial importance were believed to be dealt with in the submissions which the Board had received for the hearing; for other chemicals the Committee recommended the tariff treatment proposed for the heading, 15 p.c., B.P. and 20 p.c., M.F.N.

HALOGENATED, SULPHONATED, NITRATED OR NITROSATED DERIVATIVES
OF PRODUCTS FALLING WITHIN B.T.N. HEADING 29.11 AND 29.12

The Explanatory Notes to the Brussels Nomenclature, 1955 and the Industry Committee's Statement indicate this heading includes:

"Halogenated, sulphonated, nitrated or nitrosated derivatives of products falling within heading No. 29.11. These products are derived from aldehydes by replacing one or more of the hydrogen atoms (other than a hydrogen in the aldehyde group) by one or more halogens or nitro groups ... sulphonic groups ... or nitroso groups."(1)

The same sources show that the heading excludes chloral hydrate (heading 29.04) for which a proposal by one company was withdrawn.(2)

No product was brought before the Board during the hearing on this heading. However, in its general submission on a number of chemicals, the Canadian Pharmaceutical Manufacturers Association included as a product of minor importance to its members:

m-Nitrobenzaldehyde(3)

The Association's proposal, not opposed, was:

"Chemicals not 'Made in Canada' to be used for manufacturing pharmaceutical products shall enter at rates of 0 per cent and 15 per cent unless otherwise provided for. Chemicals made in Canada shall carry the 'Heading Rates'."(4)

The Industry Committee suggested that "heading rates" should apply to other products of heading 29.12 for which no significant commercial importance was evident at the time of the hearing.(5) The rates proposed were 15 p.c., B.P., 20 p.c., M.F.N.

(1) Explanatory Notes to the Brussels Nomenclature, 1955 and Transcript, Vol. 57, p. 8696

(2) Transcript, Vol. 57, p. 8697

(3) Same, Vol. 87, p. 13294

(4) Same, Vol. 87, p. 13283

(5) Same, Vol. 57, p. 8697

KETONES, ~~KETONE-ALCOHOLS~~, ~~KETONE-PHENOLS~~, ~~KETONE-ALDEHYDES~~,
~~QUINONES~~, ~~QUINONE-ALCOHOLS~~, ~~QUINONE-PHENOLS~~, ~~QUINONE-~~
~~ALDEHYDES~~ AND OTHER SINGLE OR COMPLEX OXYGEN-FUNCTION
 KETONES AND QUINONES, AND THEIR HALOGENATED, SULPHONATED,
NITRATED OR NITROSATED DERIVATIVES - B.T.N. 29.13

At the time of the public hearing, shipments of chemicals classified to this heading were valued at under \$3 million and accounted for less than two per cent of the value of shipments of all the chemicals in Chapter 29. Acetone is the product of chief commercial importance. Two or three other products of the heading gain considerable importance, however, from captive use or as intermediate chemicals in a production process. Among these are acetone, which also is exported in significant amounts, and cyclohexanone, which gains its importance chiefly in the form of a mixture with cyclohexanol, as an intermediate in the manufacture of nylon. In 1963, isophorone, a solvent, accounted for most of the imports of products under the heading; imports of this product were valued at \$150,000. At the time of the hearing, isophorone was ruled not made in Canada; it is now ruled made in Canada. Methyl ethyl ketone is also a product of some commercial importance.

The Industry Committee indicated that, in its opinion, all products of this heading of commercial importance at the time of the hearing in September, 1961 had been dealt with before the Board; the Committee proposed that other products be dutiable at the rates proposed for the heading, 15 p.c., B.P., 20 p.c., M.F.N.

In describing the scope of the heading, a spokesman for the Industry Committee noted that:

"Ketones are chemicals characterized by the so-called 'carbonyl' group ($=\text{CO}$) which is present in ketonic form isomers but may be modified to ($=\text{C}(\text{OH})$ -) in enolic form isomers.

"Quinones are chemicals containing a benzene ring in which two hydrogen atoms have been replaced by oxygen atoms.

"Ketone-alcohols are chemicals with a molecule containing both ketone and alcohol groups. Similarly ketone-phenols, ketone-aldehydes, quinone-alcohols, quinone-phenols and quinone-aldehydes are single, oxygen-function chemicals with molecules containing both of the designated groups. A complex oxygen-function ketone or quinone contains more than one oxygen-function group in addition to the ketone or quinone group in the molecule.

"Both natural and man-made camphor are among the ketones classified by Heading No. 29.13."⁽¹⁾

(1) Transcript, Vol. 57, p. 8701-2

Acetone

The three Canadian producers of acetone are B.A.-Shawinigan Limited, at Montreal, Quebec (now part of Shawinigan Chemicals Limited), Canadian Chemical Company Limited at Edmonton, Alberta, and Shell Oil Company of Canada Limited (now Shell Canada Limited), at Montreal, Quebec. Each company uses a different method of production. The first oxidizes cumene to cumene hydroperoxide, from which phenol and acetone are obtained as co-products. Canadian Chemical Company obtains acetone as one of the products of the primary oxidation of a mixed hydrocarbon feed stock, while Shell Oil uses a third method, the dehydrogenation of isopropanol obtained from propylene.

Acetone's many uses, which depend largely on its great solvent power, occur mostly in the paint and varnish, textile, synthetic rubber, pharmaceutical, resins and plastics industries, but it is also the solvent used for packing acetylene in cylinders. Shawinigan's output, at the time of the hearing, was mostly for commercial sale, but the company uses some acetone captively in making bisphenol. Captive use by Canadian Chemical Company is for the production of other chemicals and the spinning of acetate yarn; part of this company's acetone is sold and Shell's production is sold. At the time of the hearing, in 1961, Shawinigan's projected acetone derivatives plant was expected to increase captive use of acetone for making bisphenol, diacetone alcohol, hexylene glycol, mesityl oxide, methyl isobutyl ketone, methyl isobutyl carbinol and isophorone.

Imports of acetone have been small, and have come almost entirely from the United States; in 1959, imports were valued at slightly more than \$10,000, rising to just over \$24,000 in 1960 and dropping to about \$18,000 in 1963. At the U.S. price of $6\frac{1}{2}$ cents per pound in 1963 and $8\frac{1}{2}$ cents per pound in 1959 and 1960, these data indicate a range of from 120,000 pounds in 1959 to 285,000 pounds in 1960 and about 284,000 pounds in 1963. Shawinigan Chemicals noted that imports comprised less than one per cent of the Canadian market, indicating a domestic market of around 30 million pounds which, valued at the U.S. selling price of $6\frac{1}{2}$ cents a pound, would be worth some \$2 million. In 1963, about one quarter of total imports were entered duty-free and the remainder were dutiable at 25 per cent.

At the time of the hearing, exports to the United States, Europe, the Caribbean area and Latin America were an important outlet for acetone produced by B.A.-Shawinigan.⁽¹⁾ In many years Canada was a net exporter of acetone.

The existence of tariff item 166, in which acetone is named, with rates of 5 p.c., B.P. and 25 p.c., M.F.N., was credited with keeping imports at a low volume and with allowing the development of Canadian production in quantities sufficient for the Canadian market, though no precise relationship was drawn between these rates of duty and the price or costs of production in Canada to provide any measure of the importance of the duty. The pricing and costing of the product is complicated by the fact that it is a co-product in the production process and, for at least one producer, also has important captive use.

(1) Transcript, Vol. 57, p. 8710

Moreover, export sales must be priced competitively in the market to which they are destined, irrespective of any effect which the Canadian Customs Tariff might have on the price in this country.

As has been noted above, most imports appear to be dutiable at the 25 p.c. rate. End-use items 851 and 863, which allow duty-free imports, were said to make some imports competitive with Canadian production. The two companies making representations before the Board (B.A.-Shawinigan and Canadian Chemical) proposed rates of 15 p.c., B.P. and 20 p.c., M.F.N.(1) Shell Oil Company of Canada Limited made no submission on acetone.(2) Shawinigan Chemicals proposed that tariff item 863 be eliminated.

An interest in acetone was expressed by Polymer Corporation Limited with respect to tariff item 851, materials for use in the manufacture of synthetic rubber. The company requested that the existing duty-free provision of that item be retained.(3)

The Canadian Pulp and Paper Association, some of whose members use acetone as a paint remover in maintenance work, requested that there be no increase in rates of duty.(4)

Acetone was included as one of the more important chemicals in a list submitted by the Canadian Pharmaceutical Manufacturers Association in recommending that some end-use treatment be adopted for chemicals used in the manufacture of pharmaceutical products. The Association recommended that rates of Free, B.P. and 15 p.c., M.F.N. should apply when the chemicals are not made in Canada and that the rates proposed by the Industry Committee for the heading, 15 p.c., B.P. and 20 p.c., M.F.N. should apply when they are made in Canada.

Methyl Ethyl Ketone

Shell Oil Company of Canada Limited was named as the only Canadian producer of methyl ethyl ketone at the time of the hearing.(5) Imperial Oil Limited, a consumer, estimated the petroleum industry's consumption of "M.E.K.", for the removal of wax from lubricating oil, as roughly 33 per cent of the Canadian market.(6) For this purpose and for the further refining of waxes, Imperial Oil estimated the value of consumption of this ketone and of methyl isobutyl ketone at about \$462,000 per year. M.E.K. is used also as an industrial solvent, for which methyl isobutyl ketone is a competitive product. In 1964, the first year for which data became available, imports of M.E.K. were 795,000 pounds, valued at \$98,000, an average value of about 12 cents per pound. All imports were from the U.S.A.

(1) Transcript, Vol. 57, p. 8709, 8730

(2) Same, Vol. 78, p. 11966

(3) Same, Vol. 55, p. 8301

(4) Same, Vol. 36, p. 5245

(5) Same, Vol. 58, p. 8743

(6) Same, Vol. 58, p. 8741

Under tariff item 263b, methyl ethyl ketone may enter free of duty for petroleum refining. Imperial Oil Limited stated that its entire supplies are bought in Canada at prices competitive with duty-free imports. The published price in the U.S.A. was 12½ cents per pound from 1958 to 1965; that in Canada, 14 cents for the same period. For uses other than in petroleum refining, the company had no objection to the adoption of the Industry Committee's proposed heading rates of 15 p.c., B.P. and 20 p.c., M.F.N., but for the end-use specified, Imperial Oil said, at this hearing and at the hearing on B.T.N. 38.19, that it supported the continued free entry of methyl ethyl ketone as provided under tariff item 263b.⁽¹⁾ Not mentioned at the hearing were two tariff items in which M.E.K. is named. These are: item 208v, which provides for methyl ethyl ketone, n.o.p., Free, B.P. and 25 p.c., M.F.N. and item 833, methyl ethyl ketone imported for use exclusively as a solvent for polyvinyl chloride, duty-free under the B.P. and M.F.N. Tariffs.

Methyl Isobutyl Ketone

Methyl isobutyl ketone (MIBK) is, like methyl ethyl ketone, a solvent used in the refining of lubricating oils and in the selective distillation of waxes. The only producer, at the time of the hearing, was Canadian Chemical Company, Limited, using the oxidation of mesityl oxide. B.A.-Shawinigan Limited (now part of Shawinigan Chemicals Limited) began the production of MIBK in 1961.

The spokesman for Imperial Oil Limited suggested, as a rough estimate, that 83 per cent of this ketone was used for de-waxing lubricating oils; this estimate was challenged by the representative of Canadian Chemical Company.⁽²⁾ This opinion (and that of the spokesman for B.A.-Shawinigan) was that a large share of the market for this ketone was as a solvent for nitrocellulosic and vinyl resins, acrylic ester resins, some alkyds, natural resins or gums, aircraft dopes, adhesives, rubber cements and phenolic can coating lacquers and also as an extractant for antibiotics and as an intermediate for the production of methyl isobutyl carbinol. B.A.-Shawinigan Limited noted in its presentation that:

"The principal uses in Canada are as a solvent, for the extraction of wax from lubricating oils, and as an intermediate in the production of methyl isobutyl carbinol. We estimate that the total Canadian market for these uses is in the order of 4 or 5 million pounds per year."⁽³⁾

As with methyl ethyl ketone, large quantities of methyl isobutyl ketone are used by Imperial Oil Limited at its refineries near Edmonton and Sarnia for the extraction of wax from lubricating oil. Consumption of the two ketones was estimated at about \$462,000 per year for this purpose. Although the published Canadian price is 16½ cents per pound, in tank cars, delivered, Canadian Chemical Company, in 1961, was selling "MIBK", delivered, for refining oil at the duty-free U.S. price of 14½ cents a pound. This contract price was said to be attrib-

(1) Transcript, Vol. 58, p. 8745; Vol. 115, p. 17362

(2) Same, Vol. 58, p. 8751

(3) Same, Vol. 58, p. 8751, 8770-1

utable to the duty-free provision of tariff item 263b. Imports for other than petroleum refining purposes would generally be dutiable under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. The only available data on imports, for the first six months of 1960, indicate that they were negligible at that time, and this was the assessment by Canadian Chemical.

Rates of 15 p.c., B.P., 20 p.c., M.F.N., were proposed for methyl isobutyl ketone by the two manufacturers; Imperial Oil Limited, however, asked continuation of duty-free entry for MIBK when for use in refining oil, as currently provided by tariff item 263b.⁽¹⁾

Acetophenone

Acetophenone (methyl phenol ketone) could be produced at the rate of about 750,000 pounds per year, as a by-product in the manufacture of phenol by B.A.-Shawinigan Limited (now part of Shawinigan Chemicals Limited).⁽²⁾ There are also a number of other processes for producing it. For lack of a market in Canada and in the face of a high duty going into the United States, it is not economic to separate acetophenone; it is disposed of by blending with other boiler fuels.

Outside of Canada, various grades of acetophenone are perfume bases, solvents for vinyl and cellulose resins, polystyrene, natural gums and resins; it also is used as an intermediate in the production of styrene or of fine chemicals. The price of the technical grade in the U.S.A. was said to be 30 cents a pound in tank car lots, and of the perfume grade, up to \$1.30 per pound.

If imported, acetophenone would be dutiable under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N.

B.A.-Shawinigan Limited would seek to supply any potential Canadian user from Canadian production under the protection of the proposed rates for heading 29.13, of 15 p.c., B.P. and 20 p.c., M.F.N. The company took the view that the product did not warrant separate provision. No opposition was heard.

Diacetone Alcohol, Mesityl Oxide and Isophorone

At the time of the hearing, B.A.-Shawinigan Limited was setting up the first Canadian plant to manufacture diacetone alcohol, mesityl oxide, and isophorone, following its intended production of methyl isobutyl ketone by the alcohol condensation of acetone. All of these were expected to be available commercially late in 1962.⁽³⁾

Diacetone alcohol is a solvent for use in making cellulose nitrate, cellulose acetate, polyvinyl chloride, polyvinyl acetate, epoxy resins, some dye stuffs, pentachlorophenol, and certain coating formulations. The 1961 price in the U.S.A. was 13 cents per pound in tank car lots, delivered, and has continued at that level into 1965.

(1) Transcript, Vol. 115, p. 17362; Vol. 58, p. 8745

(2) Same, Vol. 58, p. 8761

(3) Same, Vol. 58, p. 8774

The company estimated that Canadian consumption was somewhat less than 200,000 pounds per year, though a significant increase was anticipated.

Mesityl oxide is made by the dehydration of diacetone alcohol. In addition to its main use in making methyl isobutyl ketone, mesityl oxide may be used as a solvent for cellulosic and vinyl chloride type resins and for lacquers. At the time of the hearing in 1961, it was not made in Canada and no estimate of Canadian imports or market was available. The United States price in 1961 was $12\frac{1}{2}$ cents per pound, tank cars, delivered, from 1958 into 1965.

Isophorone is an excellent non-toxic solvent for a variety of synthetic resins, natural resins and waxes and, because of its slow evaporation, is suitable for roller-applied finishes, especially for vinyl coatings for food containers. For this purpose, at that time, no Canadian-made solvent was known. Like the two ketones already mentioned, its production by B.A.-Shawinigan Limited was planned for 1962 and it has since been ruled made in Canada for Customs purposes. In 1963, before Canadian production began to affect the supply position, imports were valued at \$150,000, 67 per cent higher than those of 1960. At about 22.5 cents per pound, this value of imports would represent between 600,000 and 700,000 pounds. At this price, isophorone is a relatively high cost solvent when compared to some other solvents, which may be 4 or 5 cents a pound. However, for some uses such as coatings for food containers, some of the other solvents, for example cyclohexanone, are not used.

Diacetone alcohol and mesityl oxide may be entered into Canada under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N.; isophorone, after the made-in-Canada ruling, has been dutiable under tariff item 711 at rates of 15 p.c., B.P., 20 p.c., M.F.N. B.A.-Shawinigan proposed that rates of 15 p.c., B.P. and 20 p.c., M.F.N. should apply to these three ketones on the grounds that ketones and the esters of acetic acid are competitive and partly or wholly interchangeable in much of their commercial application.⁽¹⁾ The company expected to be producing these three and apparently was producing isophorone in 1965.

The Canadian Paint Varnish and Lacquer Association opposed the proposal for rates of 15 p.c., B.P., 20 p.c., M.F.N. for isophorone, at that time, proposing instead that this material be allowed free entry under both B.P. and M.F.N. Tariffs until made in Canada.⁽²⁾ When it is available from Canadian production, the Association would not oppose rates of 15 p.c., B.P., 20 p.c., M.F.N., those now in effect for the product.

Tetrachlorobenzoquinone
and 2, 3 - Dichloro-1,4-Naphthoquinone

Two fungicides imported from the United States are known commercially as "Spargon" (containing not less than 95 per cent tetrachlorobenzoquinone) and "Phygon Technical" or "Dichlone" (containing

⁽¹⁾ Transcript, Vol. 58, p. 8773

⁽²⁾ Same, Vol. 58, p. 8781

not less than 95 per cent 2, 3-Dichloro-1,4-Naphthoquinone). The former is used chiefly in the treatment of vegetable seeds; the latter for fruits, berries and vegetables, as a feed protectant and in some situations as an algicide.

Neither of these agricultural chemicals was made in Canada at the time of the hearing, and Naugatuck Chemicals Division of Dominion Rubber Company Limited submitted that it was the sole importer of these materials used for formulation into commercial pesticides. The possibility that competitive substitutes are made in Canada was admitted by the company's spokesman who said, however, that most fungicides are imported into Canada.

Free entry of both chemicals for use as a material for the manufacture of pesticides or for use as pesticides is provided under tariff items 791 and 219a(2) respectively. The latter is limited to packages exceeding three pounds in weight; when in packages not exceeding three pounds in weight, item 219a(1) applies, with rates of Free, B.P. and $12\frac{1}{2}$ p.c., M.F.N. Most imports were said to be entered under tariff item 791.

The major importer, Naugatuck Chemicals Division, proposed the continuation of free entry for both chemicals until such time as they are made in Canada. However, when "...manufactured in Canada, Naugatuck Chemicals favours duty rates of 15-20 on any imported material, provided that the end products made from this chemical are also subject to these rates of duty."⁽¹⁾ No opposition was raised but in its end-use proposals, the Canadian Federation of Agriculture indicated an interest in maintaining the rates under tariff items 791 and 219a for agricultural chemicals.⁽²⁾ Its views and arguments are dealt with more fully in the parts of this report on fertilizers (B.T.N. Chapter 31) and pesticides (B.T.N. heading 38.11).

Menadione; Menadione Sodium Bisulphite

Menadione is a synonym for 2-methyl-1,4-naphthaquinone, a synthetic substitute for Vitamin K; it is used for human consumption. Menadione sodium bisulphite, a derivative of menadione, is used in poultry feeds. Abbott Laboratories Limited, of Montreal, Quebec, imports these chemicals and made the only presentation before the Board concerning them. The company gave no data from which their significance can be assessed and none is publicly available. Until it was ruled made in Canada, menadione sodium bisulphite, when for use as an additive for poultry feeds, could have been entered free of duty under tariff item 219h; now that it is made in Canada, it is dutiable at 15 p.c., B.P., 20 p.c., M.F.N. under tariff item 711. When for human consumption, menadione may be entered under item 208t at rates of Free, B.P. and 15 p.c., M.F.N. The company, in recommending that no change be made in the applicable rates of duty, apparently intended that rates of Free, B.P., 15 p.c., M.F.N. should apply to both products.

(1) Transcript, Vol. 58, p. 8786, 8792

(2) Same, Vol. 110, p. 16631-2

Ionone and Methyl Ionone

These two chemicals, the subject of a submission by A. Boake, Roberts and Co. Ltd., London, England, were among the eleven listed by the Toilet Goods Manufacturers Association as imports for the perfumery industry.⁽¹⁾ Boake, Roberts & Co. estimated that total consumption of each would not exceed 10,000 pounds per year.⁽²⁾

Prices at the time of the hearing were said to be approximately \$5.60 per pound for ionone and approximately \$5.95 per pound for methyl ionone. Rates of Free, B.P. and 15 p.c., M.F.N. were proposed by Boake, Roberts and Company until these chemicals are made in Canada.

Besides the two above, nine ionones were listed by the Toilet Goods Manufacturers Association. All apparently are entered as essential oils under tariff item 264a at rates of Free, B.P. and 7½ p.c., M.F.N. Item 264a is not in Reference 120. The products are:

Ionone alpha
Ionone beta
Ionone alpha-beta
Ionone terpenes
Methyl ionone alpha
Methyl ionone beta
Methyl ionone delta
Methyl ionone gamma
Allyl-a-ionone

The Association expressed the wish that, in providing for the classification of these perfume ingredients in Brussels heading 29.13, the applicable duties would not exceed Free, B.P., 7½ p.c., M.F.N.⁽³⁾

W.J. Bush and Co. (Canada) Ltd. also mentioned "Ionones (Ionone 100%, a-Ionone, B-Ionone)" among seven ketones which are imported from the parent company in London, England. By this company's proposal, if these products become made in Canada, the applicable duty would be 15 p.c., B.P. and 20 p.c., M.F.N. The other chemicals listed by W.J. Bush are:

Benzophenone
Benzylidene Acetone
Diacetyl
p-Methoxyacetophenone
Methyl Naphthyl Ketone
p-Methoxy Benzyl Acetone

The chemicals listed by W.J. Bush and Co. (Canada) Ltd. were said to be imported from the parent company, W.J. Bush and Co., England, under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. None of these chemicals was made in Canada at the time of the hearing, and until such time as they are, the importer proposed that they should continue to be entered at the current rates; if they are made in Canada, the company proposed that rates of 15 p.c., B.P. and 20 p.c., M.F.N. should apply.

⁽¹⁾ Transcript, Vol. 58, p. 8795; Vol. 87, p. 13215

⁽²⁾ Same, Vol. 58, p. 8796

⁽³⁾ Same, Vol. 87, p. 13216 and following

The ionones and diacetyl, when for use in the manufacture of perfumes or flavouring essences, are admissible under tariff item 264a which is not in Reference 120.

d-Carvone
p-Methylacetophenone
Propiophenone

These three ketones were listed by W.J. Bush and Co. Limited on behalf of its Canadian-owned subsidiary, W.J. Bush and Co. (Canada) Limited. There is no significant market for any of them in Canada. In the hope of a future market for them, which W.J. Bush could supply, a request was made for continuation of the present British preference. Now eligible for entry under tariff item 208t at Free, B.P. and 15 p.c., M.F.N., they would become dutiable at rates of 15 p.c., B.P., 20 p.c., M.F.N., if made in Canada. These chemicals may also be classified as essential oils under tariff item 264a, at rates of Free, B.P. and 7½ p.c., M.F.N.

Acetylacetone

This chemical was not made in Canada at the time of the hearing, although its major ingredients, ethyl acetate and acetone, were said to be available. Besides its use in making veterinary grade sodium sulfamethazine, it may be used as a solvent for cellulose acetate, a drier for varnishes and inks, and in the manufacture of gasoline additives. Imports were valued at \$100,000 in 1962 and \$80,000 in 1963.

When for use in the manufacture of sulpha drugs, acetylacetone was at one time entered free of duty under item 208z, free of duty under both the B.P. and M.F.N. Tariffs; this item has now expired. If imported for other purposes it was dutiable under item 208t at rates of Free B.P. and 15 p.c., M.F.N. Apart from end-use considerations it is now entered under item 208t.

Naugatuck Chemicals took no position with regard to end-use tariff item 208z, as such, but it did propose continued free entry for the product until it is ruled made in Canada.⁽¹⁾ In line with its general brief, the company opposed any changes that would increase the duty on its materials unless corresponding changes were made to the rates on its final products.⁽²⁾

Cyclohexanone

Cyclohexanone-cyclohexanol mixtures (B.T.N. heading 38.19) are made in Canada as intermediates for nylon production. Cyclohexanol, B.T.N. 29.05, as a single chemical is also made in Canada. Cyclohexanone is not made in Canada, but might be imported as a solvent, competitive with isophorone (above); pure foods regulations, however, forbid its use in coating tins for foods and beverages.⁽³⁾ It might also be

(1) Transcript, Vol. 74, p. 11279

(2) Same, Vol. 6, p. 889-900

(3) Same, Vol. 58, p. 8781

imported as a single chemical and then be mixed with cyclohexanol to obtain the necessary intermediate for adipic acid and nylon 6/6 or for use as a plasticizer. Small imports of both cyclohexanone and cyclohexanol as separate chemicals were reported, and exceeded \$12,000 in six months of 1960.⁽¹⁾ No manufacturer or user of cyclohexanone submitted a brief on it alone, but rates of 15 p.c., B.P., 20 p.c., M.F.N. were proposed for the mixtures of cyclohexanol and cyclohexanone under Brussels Heading 38.19, as dealt with elsewhere in this report.

For the products listed below, The Toilet Goods Manufacturers Association expressed the same interest as noted above for ionones; these are imported under tariff item 264a which is not in Reference 120.

Acetanisole
Benzophenone
Benzyliden Acetone 2nd
Gum Camphor
Irone
Jasmone
Methyl Acetophenone 1st
Methyl Hexyl Ketone
Methyl Naphthyl Ketone (Acetonaphthone)
Methyl Nonyl Ketone
Musk Ketone

The Canadian Pharmaceutical Manufacturers Association submitted to the Board a list of chemicals used by its members in the manufacture of pharmaceutical products and recommended that some end-use treatment be adopted for these chemicals. The Association recommended that rates of Free, B.P. and 15 p.c., M.F.N. should apply when the products are not made in Canada and that the heading rates proposed by the Industry Committee, 15 p.c., B.P. and 20 p.c., M.F.N., should apply when the products are made in Canada. The chemicals, in addition to acetone already noted, in which it expressed an interest under this heading are listed below; these products were considered to be of minor commercial importance to the pharmaceutical manufacturers.

Bromocamphor
Camphor (See below)
Chloranil
17-beta-Hydroxy-17 alpha-methylandrosta-1:
4-diene-3-one (Methandienone)
11 alpha-Hydroxypregn-4-ene-3:20-dione
17-beta-Hydroxy-17 alpha-1-nyloestr-
4-en-3-one
Menaphthone
p-Methoxyacetophenone
17-beta-Hydroxy-2-hydroxymethylene-17
alpha-methyl-5-alpha-androstan-3-one
Hydroxyprogesterone

(1) Transcript, Vol. 117, p. 17542-3; Department of Trade and Commerce, Spotlight on Chemicals

Camphor is named in tariff item 264b, under which rates of Free, B.P. and 5 p.c., M.F.N. apply.

Canada Packers Limited submitted a brief on the following six chemicals which are derivatives of the bile acids obtained in meat packing plants. The company's submission is noted further with respect to the bile acids under heading 29.16. These are intermediates in the manufacture of steroids. The spokesman for the Industry Committee noted that these chemicals might be entered free of duty under tariff item 863 when for use in the manufacture of steroid derivatives. Otherwise, because they are not ruled made in Canada they would be dutiable under tariff item 208t at rates of Free, B.P., 15 p.c., M.F.N. The company recommended rates of 15 p.c., B.P. and 20 p.c., M.F.N.(1) The chemicals are as follows:

12a, Acetoxypregnan-3,20-dione
 12a, Hydroxypregnan-3,20-dione
 5B-Pregnan-3a-ol-20-one (epipregnanolone)
 11-Pregnene-3,20-dione
 3,6a-Dihydroxypregnane-20-one
 3a,12a-Diacetoxypregnan-20-one

(1) Transcript, Vol. 66, p. 10075

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Table 1

Imports: Benzol of all kinds, s.c. 7070^(a)

Tariff Items 263a, 269(ii), 711 and 851

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u> <u>p.c. of</u> <u>Dutiable</u>
	<u>gal.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	<u>\$/gal.</u>	<u>\$</u>	<u>\$</u>	<u>Value</u>
				(000)		
<u>1. Total</u>						
1953	609	288	.47	1	145	11.5
1954	1,947	853	.44	2	294	13.5
1955	1,817	677	.37	233	46,441	20.0
1956	2,321	824	.35	616	123,154	20.0
1957	2,201	802	.36	678	133,019	19.6
1958	8,151	2,909	.36	1,704	200,204	11.8
1959	4,580	1,504	.33	1,333	164,526	12.3
1960	7,611	2,769	.36	2,194	306,810	14.0
1961	4,598	2,066	.45	1,241	109,038	8.8
1962	1,133	324	.29	322	4,534	1.4
1963	4	4	1.00	2	330	14.4
1964 ^(b)	178	4	.02	4	678	17.9

2. United States

1953	260	115	.44	1	145	11.5
1954	1,947	853	.44	2	294	13.5
1955	1,123	446	.40	2	324	14.8
1956	485	209	.43	1	131	20.1
1957	540	225	.42	101	17,533	17.4
1958	5,658	2,011	.36	965	52,391	5.4
1959	3,972	1,325	.33	1,154	128,864	11.2
1960	5,114	1,898	.37	1,324	132,731	10.0
1961	2,992	1,335	.45	724	5,555	.8
1962	1,133	324	.29	322	4,534	1.4
1963	4	4	1.00	2	330	14.4
1964 ^(b)	178	4	.02	4	678	17.9

Table 1
(Cont'd)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>gal.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)	<u>\$/gal.</u>	<u>\$</u>	<u>\$</u>	<u>Dutiable</u>
				(000)		<u>Value</u>
<u>3. Netherlands</u>						
1953	349	173	.50	-	-	-
1954	-	-	-	-	-	-
1955	694	231	.33	231	46,117	20.0
1956	1,836	615	.33	615	123,023	20.0
1957	1,661	577	.35	577	115,486	20.0
1958	1,095	430	.39	430	85,944	20.0
1959	607	178	.29	178	35,629	20.0
1960-64	-	-	-	-	-	-
<u>4. U.S.S.R.</u>						
1953-57	-	-	-	-	-	-
1958	992	309	.31	309	61,839	20.0
1959	-	-	-	-	-	-
1960	2,052	621	.30	621	124,224	20.0
1961	983	393	.40	393	78,606	20.0
1962-64	-	-	-	-	-	-

- (a) Beginning in 1964 renumbered as s.c. 406-21, "Benzol" (benzene)
 (b) In 1964 units are in thousands of pounds and unit value in \$/lb.

Table 2

Imports: Naphthalene, solid, s.c. 8408 (a)

Tariff Items 208t, 711 and 851

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	<u>Dutiable</u>
				(000)		<u>Value</u>
<u>1. Total</u>						
1953	1,890	121	.06	3	438	15.3
1954	2,036	101	.05	2	349	18.2
1955	3,212	230	.07	22	3,329	15.4
1956	3,023	264	.09	80	12,047	15.1
1957	2,976	173	.06	2	288	18.3
1958	8,354	324	.04	4	671	15.0
1959	8,193	505	.06	*	66	15.1
1960	4,417	613	.14	1	114	15.1
1961	3,407	531	.16	2	260	15.0
1962	10,136	439	.04	1	106	15.0
1963	9,070	329	.04	*	34	15.1
1964	3,024	109	.04	8	1,625	19.6

2. United Kingdom

1953	1,038	77	.07	*	49	15.0
1954	922	42	.05	-	-	-
1955	1,170	68	.06	-	-	-
1956	89	8	.09	-	-	-
1957	462	18	.04	-	-	-
1958	698	39	.06	-	-	-
1959	1,228	68	.06	-	-	-
1960	98	5	.05	-	-	-
1961	2	*	.17	-	-	-
1962	307	14	.04	-	-	-
1963	238	11	.04	-	-	-
1964	-	-	-	-	-	-

Table 2
(Cont'd)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	

3. United States

1953	7	2	.27	2	313	15.4
1954	8	2	.27	2	349	18.2
1955	205	22	.11	22	3,329	15.4
1956	447	92	.21	80	12,047	15.1
1957	20	3	.13	2	288	18.3
1958	12	3	.21	1	112	15.0
1959	9	1	.11	*	66	15.1
1960	7	1	.10	1	114	15.1
1961	232	30	.13	-	-	-
1962	809	47	.06	1	106	15.0
1963	24	3	.11	*	34	15.1
1964	1,917	78	.04	8	1,625	19.6

4. Germany, Fed. Rep. of

1953	96	5	.06	1	76	14.9
1954	217	12	.06	-	-	-
1955	473	40	.09	-	-	-
1956	359	26	.07	-	-	-
1957	325	23	.07	-	-	-
1958	226	14	.06	4	559	15.0
1959	535	44	.08	-	-	-
1960	-	-	-	-	-	-
1961	1,772	273	.15	2	260	15.0
1962	3,008	136	.05	-	-	-
1963	7,383	259	.04	-	-	-
1964	-	-	-	-	-	-

Table 2
(Cont'd)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)	\$/lb.	\$	\$	Dutiable
				(000)		Value
<u>5. Belgium and Luxembourg</u>						
1953	110	7	.06	-	-	-
1954	111	6	.06	-	-	-
1955	44	4	.08	-	-	-
1956	584	35	.06	-	-	-
1957	801	41	.05	-	-	-
1958	3,116	102	.03	-	-	-
1959	2,924	184	.06	-	-	-
1960	2,417	340	.14	-	-	-
1961	66	13	.19	-	-	-
1962	3,622	144	.04	-	-	-
1963	1,161	39	.03	-	-	-
1964	55	5	.09	-	-	-
<u>6. Netherlands</u>						
1953	638	30	.05	-	-	-
1954	778	38	.05	-	-	-
1955	1,280	93	.07	-	-	-
1956	795	59	.07	-	-	-
1957	1,368	90	.07	-	-	-
1958	4,302	167	.04	-	-	-
1959	1,423	128	.09	-	-	-
1960	705	107	.15	-	-	-
1961	1,335	215	.16	-	-	-
1962	143	12	.08	-	-	-
1963	143	10	.07	-	-	-
1964	44	2	.04	-	-	-
<u>7. U.S.S.R.</u>						
1959	1,764	56	.03	-	-	-
1960	1,129	152	.13	-	-	-
1961	-	-	-	-	-	-
1962	2,246	86	.04	-	-	-
1963	-	-	-	-	-	-
1964	1,008	25	.02	-	-	-

(a) Prior to 1958 s.c. 8408 read as, "Naphthalene, refined, in flakes and balls", beginning in 1964 renumbered as s.c. 406-31

Table 3

Imports: Butadiene, s.c. 8428^(a)

Tariff Items 208t and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	..	150	..	*	22	19.6
1954	..	1,314	..	-	-	-
1955	..	2,890	..	-	-	-
1956	..	5,296	..	-	-	-
1957	..	6,435	..	-	-	-
1958	..	3,828	..	*	42	19.8
1959	..	1,695	..	4	499	13.0
1960	..	2,920	..	-	-	-
1961	..	3,008	..	-	-	-
1962	..	2,011	..	*	20	18.2
1963	..	3,695	..	*	26	12.4
1964	24,460	2,104	.09	-	-	-
<u>2. United Kingdom</u>						
1953-61	-	-	-	-	-	-
1962	..	753	..	-	-	-
1963	..	1,367	..	-	-	-
1964	9,091	667	.07	-	-	-
<u>3. United States</u>						
1953	..	150	..	*	22	19.6
1954	..	1,314	..	-	-	-
1955	..	2,890	..	-	-	-
1956	..	5,296	..	-	-	-
1957	..	6,435	..	-	-	-
1958	..	3,828	..	*	42	19.8
1959	..	1,695	..	4	499	13.0
1960	..	2,920	..	-	-	-
1961	..	3,008	..	-	-	-
1962	..	1,258	..	*	20	18.2
1963	..	2,328	..	*	26	12.4
1964	15,369	1,437	.09	-	-	-

(a) Beginning in 1964 renumbered as s.c. 406-09; tariff item 711 replaced by 851

Table 4

Imports: Ethyl benzene, s.c. 8429^(a)

Tariff Items 208t and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>gal.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)	<u>\$/gal.</u>	<u>\$</u>	<u>\$</u>	<u>Dutiable</u>
				(000)		<u>Value</u>
<u>1. Total</u>						
1953	201	264	1.31	-	-	-
1954	246	282	1.14	-	-	-
1955	230	249	1.08	*	12	14.8
1956	848	638	.75	*	47	14.9
1957-63	-	-	-	-	-	-
<u>2. United States</u>						
1953	201	264	1.31	-	-	-
1954	246	282	1.14	-	-	-
1955	230	249	1.08	*	12	14.8
1956	848	638	.75	*	47	14.9
1957-63	-	-	-	-	-	-

(a) Beginning in 1964 included in s.c. 406-99

Table 5

Imports: Butylenes, s.c. 406-07^(a)

Tariff Items 711 and 851

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	<u>Dutiable</u>
				(000)		<u>Value</u>
<u>1. Total</u>						
1964	7,594	384	.05	10	851	8.6
<u>2. United States</u>						
1964	7,594	384	.05	10	851	8.6

(a) Prior to 1964 included in s.c. 7186 and 8415

Table 6

Imports: Cyclohexane, s.c. 406-13^(a)

Tariff Items 711 and 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	393	160	.41	56	8,463	15.1
<u>2. United States</u>						
1964	393	160	.41	56	8,463	15.1

(a) Prior to 1964 included in s.c. 8415 and 8422

Table 7

Imports: Toluol (toluene), s.c. 406-22^(a)

Tariff Items 269(ii), 711 and 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	49,716	1,329	.03	1,209	19,407	1.6
<u>2. United States</u>						
1964	49,716	1,329	.03	1,209	19,407	1.6

(a) Prior to 1964 included in s.c. 7168, 7185 and 8422

Table 8

Imports: Xylol (xylene), s.c. 406-23^(a)

Tariff Items 269(ii), 711 and 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u> (000)	<u>\$</u> (000)	<u>\$/lb.</u>	<u>\$</u> (000)	<u>\$</u>	
<u>1. Total</u>						
1964	7,786	304	.04	302	9,468	3.1
<u>2. United States</u>						
1964	7,786	304	.04	302	9,468	3.1

(a) Prior to 1964 included in s.c. 7185 and 7187

Table 9

Imports: Isoprene, s.c. 406-91^(a)

Tariff Items 711 and 851

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u> (000)	<u>\$</u> (000)	<u>\$/lb.</u>	<u>\$</u> (000)	<u>\$</u>	
<u>1. Total</u>						
1964	2,135	537	.25	1	47	4.9
<u>2. United States</u>						
1964	2,135	537	.25	1	47	4.9

(a) Prior to 1964 included in s.c. 7168

Table 10

Imports: Ethyl chloride, s.c. 8388^(a)

Tariff Items 208t, 219d(1), 263d and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiabale</u>	<u>Duty</u>	<u>Duty as</u> <u>p.c. of</u> <u>Dutiabale</u> <u>Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
				(000)		
<u>1. Total</u>						
1953	692	80	.12	*	32	14.9
1954	674	76	.11	*	32	14.8
1955	702	78	.11	*	9	15.3
1956	4,440	325	.07	*	9	15.5
1957	23,377	1,596	.07	*	18	15.1
1958	20,541	1,389	.07	10	1,449	15.0
1959	20,696	1,471	.07	-	-	-
1960	19,854	1,432	.07	*	28	16.5
1961	322	36	.11	*	68	13.7
1962	13	11	.87	-	-	-
1963	12	12	1.02	*	60	15.2
1964	10	10	1.02	*	84	16.9
<u>2. United States</u>						
1953	691	79	.11	*	32	14.9
1954	674	76	.11	*	32	14.8
1955	702	78	.11	*	9	15.3
1956	4,440	325	.07	*	9	15.5
1957	23,375	1,595	.07	*	18	15.1
1958	20,541	1,389	.07	10	1,449	15.0
1959	20,696	1,470	.07	-	-	-
1960	19,854	1,432	.07	*	28	16.5
1961	322	36	.11	*	68	13.7
1962	13	11	.87	-	-	-
1963	12	12	1.02	*	60	15.2
1964	10	10	1.02	*	84	16.9

^(a) Beginning in 1964 renumbered as s.c. 406-39

Table 11

Imports: Ethylene dichloride and dichlor formal, s.c. 8390^(a)

Tariff Items 208t and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
<u>1. Total</u>						
1953	566	53	.09	53	10,645	20.0
1954	81	9	.11	8	1,595	20.0
1955	89	8	.09	8	1,507	20.0
1956	101	9	.09	9	1,701	18.3
1957	65	6	.09	6	1,203	20.0
1958	36	3	.08	3	545	19.5
<u>2. United States</u>						
1953	566	53	.09	53	10,645	20.0
1954	81	9	.11	8	1,595	20.0
1955	89	8	.09	8	1,507	20.0
1956	101	9	.09	9	1,701	18.3
1957	65	6	.09	6	1,203	20.0
1958	36	3	.08	3	545	19.5

(a) Beginning in 1959 included in s.c. 8415

Table 12

Imports: Carbon tetrachloride, s.c. 8396^(a)

Tariff Items 208t and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>¢</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	¢/lb.	¢	¢	
				(000)		
<u>1. Total</u>						
1953	1,028	89	.09	89	17,676	19.9
1954	625	52	.08	51	10,089	20.0
1955	538	47	.09	46	9,270	20.1
1956	402	32	.08	32	6,487	20.0
1957	170	15	.09	15	2,896	19.5
1958	263	24	.09	23	4,602	19.8
1959	128	12	.09	11	2,112	19.4
1960	276	21	.08	21	4,333	20.4
1961	438	40	.09	39	7,520	19.3
1962	388	35	.09	35	8,306	23.5
1963	212	18	.08	17	3,459	20.1
<u>2. United States</u>						
1953	1,027	89	.09	89	17,676	19.9
1954	614	51	.08	51	10,089	20.0
1955	527	46	.09	45	9,002	20.0
1956	181	17	.09	17	3,374	20.0
1957	17	3	.15	2	447	18.3
1958	59	7	.12	7	1,417	20.0
1959	21	4	.17	3	453	17.5
1960	7	1	.19	1	219	20.1
1961	31	7	.24	7	1,052	15.5
1962	32	8	.23	8	1,569	20.8
1963	23	4	.17	4	734	20.7

Table 12
(Cont'd)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)	\$/lb.	\$	\$	Dutiable
				(000)		Value
<u>3. Germany, Fed. Rep. of</u>						
1953-55	-	-	-	-	-	-
1956	166	12	.07	12	2,313	20.0
1957	153	12	.08	12	2,449	19.7
1958	199	16	.08	16	3,185	19.7
1959	85	7	.08	7	1,344	20.0
1960	88	7	.08	7	1,429	20.0
1961	256	21	.08	21	4,286	20.0
1962	70	6	.09	6	1,575	25.0
1963	-	-	-	-	-	-
<u>4. Belgium and Luxembourg</u>						
1953-59	-	-	-	-	-	-
1960	99	7	.07	7	1,512	21.1
1961	110	8	.07	8	1,580	20.0
1962	176	13	.07	13	2,952	23.5
1963	186	13	.07	13	2,673	20.0

(a) Beginning in 1964 included in s.c. 406-99

Table 13

Imports: Trichloroethylene, s.c. 406-53^(a)

Tariff Item 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	2,302	208	.09	206	39,615	19.2
<u>2. United Kingdom</u>						
1964	13	2	.14	-	-	-
<u>3. United States</u>						
1964	241	31	.13	31	5,920	18.9
<u>4. France</u>						
1964	1,078	93	.09	93	17,397	18.6
<u>5. Sweden</u>						
1964	933	79	.08	79	15,724	20.0

(a) Prior to 1964 included in s.c. 8415

Table 14

Imports: Chloroform, s.c. 8397^(a)

Tariff Items 219d(1) and 219d(2)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)	<u>¢/lb.</u>	<u>\$</u>	<u>\$</u>	<u>Dutiable</u>
				(000)		<u>Value</u>
<u>1. Total</u>						
1953	107	30	.28	10	2,061	20.0
1954	174	41	.24	23	4,664	20.0
1955	174	49	.28	14	2,798	20.0
1956	437	66	.15	48	9,619	20.0
1957	591	85	.14	65	12,996	20.0
1958	409	55	.14	51	10,279	20.0
1959	542	66	.12	64	12,882	20.0
1960	617	69	.11	65	13,053	20.0
1961	936	109	.12	100	19,850	19.8
1962	979	110	.11	105	20,818	19.9
1963	68	17	.25	13	2,505	19.9
1964	1,720	170	.10	157	31,460	20.0
<u>2. United Kingdom</u>						
1953	2	1	.54	-	-	-
1954	2	1	.52	-	-	-
1955	4	2	.48	-	-	-
1956	1	*	.62	-	-	-
1957	1	1	.46	-	-	-
1958	*	*	.55	-	-	-
1959	2	*	.21	-	-	-
1960	2	1	.52	-	-	-
1961	3	1	.45	-	-	-
1962	1	1	1.23	-	-	-
1963	1	1	1.60	-	-	-
1964	1	1	1.05	-	-	-

Table 14
(Cont'd)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
<u>3. United States</u>						
1953	105	29	.28	10	2,061	20.0
1954	170	40	.23	23	4,584	20.0
1955	166	46	.28	13	2,699	20.0
1956	430	64	.15	47	9,429	20.0
1957	586	84	.14	65	12,905	20.0
1958	402	54	.13	50	10,093	20.0
1959	534	65	.12	63	12,690	20.0
1960	612	67	.11	65	12,953	20.0
1961	933	108	.12	100	19,850	19.8
1962	978	109	.11	105	20,818	19.9
1963	64	15	.24	12	2,416	19.9
1964	1,707	167	.10	156	31,257	20.0

(a) Beginning in 1964 renumbered as s.c. 406-42

Table 15

Imports: Methyl chloride, s.c. 406-35^(a)

Tariff Items 208t, 711 and 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u> <u>p.c. of</u> <u>Dutiable</u> <u>Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
	<u>1. Total</u>					
1964	1,394	143	.10	1	139	18.5
	<u>2. United States</u>					
1964	1,394	143	.10	1	139	18.5

(a) Prior to 1964 included in s.c. 8415

Table 16

Imports: Ethylene bromide, s.c. 406-40^(a)

Tariff Items 208t and 263d

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u> <u>p.c. of</u> <u>Dutiable</u> <u>Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
	<u>1. Total</u>					
1964	8,405	1,391	.17	-	-	-
	<u>2. United States</u>					
1964	8,405	1,391	.17	-	-	-

(a) Prior to 1964 included in s.c. 8415

Table 17

Imports: Chlorofluorohydrocarbons, n.e.s., s.c. 406-59^(a)

Tariff Items 208t and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	747	1,173	1.57	389	74,010	19.0
<u>2. United Kingdom</u>						
1964	100	770	7.72	-	-	-
<u>3. United States</u>						
1964	647	403	.62	389	74,010	19.0

(a) Prior to 1964 included in s.c. 8073 and 8415

Table 18

Imports: Chlorobenzene, mono-, ortho-di-, para-di-, s.c. 406-64^(a)

Tariff Items 208t and 219a(2)

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	6,768	533	.08	110	19,303	17.5
<u>2. United Kingdom</u>						
1964	548	60	.11	-	-	-
<u>3. United States</u>						
1964	6,110	465	.08	103	18,213	17.7

(a) Prior to 1964 included in s.c. 8073 and 8415

Table 19

Imports: Aldrin, technical, s.c. 406-83^(a)

Tariff Items 219a(2) and 791

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value \$/lb.</u>
	<u>lb.</u> (000)	<u>\$</u> (000)	
	<u>1. Total</u>		
1964	266	241	.91
	<u>2. United States</u>		
1964	266	241	.91

(a) Prior to 1964 included in s.c. 8073

Table 20

Imports: D.D.T., technical, s.c. 406-87^(a)

Tariff Items 219a(2) and 791

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value \$/lb.</u>
	<u>lb.</u> (000)	<u>\$</u> (000)	
	<u>1. Total</u>		
1964	1,953	350	.18
	<u>2. United States</u>		
1964	1,953	350	.18

(a) Prior to 1964 included in s.c. 8073

Table 21

Imports: Binitrotoluol, trinitrotoluol and perchlorate of ammonia,
for the manufacture of explosives, s.c. 8131(a)

Tariff Item 758

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>
	(000)	(000)	\$/lb.
<u>1. Total</u>			
1953	330	65	.20
1954	700	143	.20
1955	480	90	.19
1956	324	62	.19
1957	10	5	.54
1958	1,429	166	.12
1959	4,283	324	.08
1960	4,945	413	.08
1961	3,895	378	.10
1962	5,173	554	.11
1963	2,182	303	.14
1964	-	-	-
<u>2. United States</u>			
1953	330	65	.20
1954	700	143	.20
1955	480	90	.19
1956	201	40	.20
1957	10	5	.54
1958	1,407	163	.12
1959	4,283	324	.08
1960	4,883	407	.08
1961	3,855	374	.10
1962	5,066	540	.11
1963	2,091	292	.14
1964	-	-	-

(a) Beginning in 1964 included in s.c. 404-99 and 415-30

Table 22

Imports: Nitrotoluols and nitro compounds, n.e.s., s.c. 415-30^(a)

Tariff Items 664a and 758

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value \$/lb.</u>
	<u>lb.</u> (000)	<u>\$</u> (000)	
	<u>1. Total</u>		
1964	483	52	.11
	<u>2. United States</u>		
1964	423	46	.11
	<u>3. Germany, Fed. Rep. of</u>		
1964	60	7	.11

(a) Prior to 1964 included in s.c. 8131 and 8132

Table 23

Imports: Butyl alcohol, s.c. 8034 ^(a)

Tariff Items 207a and 791

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u> (000)	<u>\$</u> (000)	<u>\$/lb.</u>	<u>\$</u> (000)	<u>\$</u>	
<u>1. Total</u>						
1953	1,246	148	.12	131	26,179	20.0
1954	437	51	.12	31	6,299	20.0
1955	321	39	.12	19	3,717	20.0
1956	269	36	.14	24	4,842	20.0
1957	504	60	.12	59	11,847	20.0
1958	1,058	137	.13	94	18,747	20.0
1959	1,542	202	.13	68	13,641	20.0
1960	1,241	171	.14	19	3,812	20.0
1961	1,478	214	.14	60	12,066	20.0
1962	3,698	544	.15	22	4,652	20.7
1963	3,263	440	.13	113	22,437	19.9
1964	1,430	168	.12	143	28,482	20.0
<u>2. United States</u>						
1953	1,246	148	.12	131	26,179	20.0
1954	437	51	.12	31	6,299	20.0
1955	321	38	.12	19	3,717	20.0
1956	268	36	.13	24	4,842	20.0
1957	502	59	.12	59	11,847	20.0
1958	1,058	137	.13	94	18,747	20.0
1959	1,542	202	.13	68	13,641	20.0
1960	1,241	171	.14	19	3,812	20.0
1961	1,478	214	.14	60	12,066	20.0
1962	1,964	264	.13	22	4,652	20.7
1963	2,678	367	.14	113	22,437	19.9
1964	1,430	168	.12	143	28,482	20.0

(a) Beginning in 1964 renumbered as s.c. 407-21

Imports: Amyl alcohol, s.c. 8032^(a)

Tariff Item 157a

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>gal.</u>	<u>\$</u>	<u>\$/gal.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	19	23	1.24	-	-	-
1954	21	25	1.22	-	-	-
1955	12	16	1.27	-	-	-
1956	7	9	1.35	-	-	-
1957	28	38	1.36	-	-	-
1958	23	38	1.68	-	-	-
1959	44	58	1.33	1	117	20.1
1960	31	48	1.56	-	-	-
1961	53	77	1.45	-	-	-
1962	51	77	1.51	3	779	25.0
1963	98	160	1.64	*	37	20.1
<u>2. United States</u>						
1953	19	23	1.24	-	-	-
1954	21	25	1.22	-	-	-
1955	12	16	1.27	-	-	-
1956	7	9	1.35	-	-	-
1957	28	38	1.36	-	-	-
1958	23	38	1.68	-	-	-
1959	44	58	1.33	1	117	20.1
1960	31	48	1.56	-	-	-
1961	53	77	1.45	-	-	-
1962	51	77	1.51	3	779	25.0
1963	98	160	1.64	*	37	20.1

(a) Beginning in 1964 included in s.c. 407-99

Table 25

Imports: Isopropyl alcohol, s.c. 8038^(a)

Tariff Item 157c

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	gal.	\$	Value	Value	Collected	p.c. of
	(000)	(000)	\$/gal.	\$	\$	Dutiable
				(000)		Value
<u>1. Total</u>						
1953	197	103	.52	70	31,974	46.0
1954	236	112	.47	110	57,877	52.8
1955	201	84	.42	84	50,291	60.2
1956	7	4	.59	4	1,806	42.4
1957	23	32	1.43	32	5,674	17.5
1958	52	26	.50	26	12,940	49.6
1959	22	12	.55	12	5,470	45.0
1960	16	10	.65	10	3,909	38.8
1961	7	6	.87	6	1,762	29.6
1962	14	11	.81	9	2,104	23.0
1963	4	5	1.10	4	1,008	22.7
<u>2. United States</u>						
1953	193	96	.50	67	31,786	47.3
1954	236	111	.47	110	57,877	52.8
1955	201	84	.42	84	50,291	60.2
1956	7	4	.58	4	1,806	42.4
1957	23	32	1.43	32	5,674	17.5
1958	52	26	.50	26	12,940	49.6
1959	22	12	.55	12	5,470	45.0
1960	16	10	.65	10	3,909	38.8
1961	7	6	.87	6	1,762	29.6
1962	14	11	.81	9	2,104	23.0
1963	4	5	1.10	4	1,008	22.7

^(a) Beginning in 1964 included in s.c. 407-99

Table 26

Imports: Ethylene glycol and mixtures of ethylene glycol and other glycols in which ethylene glycol predominates, for use in the manufacture of anti-freezing compounds, s.c. 8399(a)

Tariff Item 207(c)(b)

Year	Total Imports		Unit Value	Dutiable Value	Duty Collected	Duty as p.c. of Dutiable Value
	lb.	\$	\$/lb.	\$	\$	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	19,622	2,827	.14	-	-	-
1954	7,803	850	.11	-	-	-
1955	7,529	894	.12	395	39,486	10.0
1956	2	*	.17	*	34	10.1
1957	13,214	1,434	.11	1,434	143,383	10.0
1958	3,097	347	.11	347	34,739	10.0
1959	24,128	2,387	.10	2,387	320,768	13.4
1960	7,534	731	.10	731	73,103	10.0
1961	1,046	111	.11	111	11,148	10.0
1962	2,150	222	.10	222	22,155	10.0
1963	2,317	260	.11	260	26,017	10.0
1964	23,923	2,959	.12	2,892	574,878	19.9
<u>2. United States</u>						
1953	19,622	2,827	.14	-	-	-
1954	7,803	850	.11	-	-	-
1955	7,529	894	.12	395	39,486	10.0
1956	2	*	.17	*	34	10.1
1957	13,214	1,434	.11	1,434	143,383	10.0
1958	3,097	347	.12	347	34,739	10.0
1959	19,818	1,945	.10	1,945	276,538	14.2
1960	7,534	731	.10	731	73,103	10.0
1961	1,046	111	.11	111	11,148	10.0
1962	2,150	222	.10	222	22,155	10.0
1963	2,317	260	.11	260	26,017	10.0
1964	23,923	2,959	.12	2,892	574,878	19.9

(a) Beginning in 1964 renumbered as s.c. 407-61, "Ethylene glycol, mono", which also includes former s.c. 8400 and part of s.c. 8415

(b) In 1964 includes tariff items 207b, 208t, and 711; also included in s.c. 407-99, "Alcohols and their derivatives n.e.s."

Table 27

Imports: Ethylene glycol, for the manufacture of explosives, and
ethylene glycol, n.o.p., s.c. 8400^(a)

Tariff Items 207b, 208t and 711

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	lb.	\$	Value	Value	Collected	p.c. of
	(000)	(000)	\$/lb.	\$	\$	Dutiable
				(000)		Value
<u>1. Total</u>						
1953	1,515	263	.17	155	25,972	16.9
1954	562	83	.15	58	10,661	18.3
1955	220	33	.15	23	4,160	18.3
1956	209	37	.18	27	4,968	18.4
1957	50	9	.19	9	1,858	19.8
1958	2,401	305	.13	304	60,724	19.9
1959	9,486	1,029	.11	1,027	230,441	22.4
1960	8,592	1,033	.12	1,033	206,067	20.0
1961	215	31	.14	20	4,007	19.6
1962	2,145	268	.12	154	38,353	24.9
1963	66	11	.17	11	1,729	15.4
<u>2. United States</u>						
1953	1,515	263	.17	154	25,972	16.9
1954	562	83	.15	58	10,661	18.3
1955	220	33	.15	23	4,160	18.3
1956	209	37	.18	27	4,968	18.4
1957	50	9	.19	9	1,858	19.8
1958	2,401	305	.13	304	60,724	19.9
1959	9,480	1,027	.11	1,027	230,441	22.4
1960	71	14	.20	14	2,400	16.9
1961	215	31	.14	20	4,007	19.6
1962	2,145	268	.12	154	38,353	24.9
1963	66	11	.17	11	1,729	15.4
<u>3. Puerto Rico</u>						
1953-59	-	-	-	-	-	-
1960	8,522	1,018	.12	1,018	203,667	20.0
1961-63	-	-	-	-	-	-

(a) Beginning in 1964 included in s.c. 407-61, "Ethylene glycol, mono", formerly s.c. 8399

Table 28

Imports: Propylene glycol, mono, s.c. 407-63^(a)

Tariff Items 208t and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	48	10	.21	10	1,726	17.0
<u>2. United States</u>						
1964.	48	10	.21	10	1,726	17.0

(a) Prior to 1964 included in s.c. 8415

Table 29

Imports: Iso-octyl alcohol, s.c. 407-78^(a)

Tariff Items 208t, 791 and 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	7,110	945	.13	21	3,369	16.0
<u>2. United States</u>						
1964	7,110	945	.13	21	3,369	16.0

(a) Prior to 1964 included in s.c. 8069, 8073, 8415 and 8422

Table 30

Imports: Fatty alcohols, s.c. 8435^(a)

Tariff Items 208t, 711, ex 711 and 865

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	..	695	..	9	31	.4
1954	..	1,162	..	46	6,925	15.2
1955	..	1,316	..	2	399	16.5
1956	..	1,166	..	10	1,915	18.8
1957	..	1,059	..	2	324	15.2
1958	..	1,527	..	7	1,230	18.5
1959	..	1,949	..	14	2,650	18.7
1960	..	1,542	..	22	3,969	17.9
1961	..	1,914	..	54	8,865	16.6
1962	9,610	1,756	.18	87	14,818	17.1
1963	9,765	1,799	.18	69	11,202	16.2
1964	14,397	2,640	.18	181	30,225	16.7
<u>2. United Kingdom</u>						
1953	-	-	-	-	-	-
1954	..	61	..	-	-	-
1955	..	121	..	-	-	-
1956	..	18	..	-	-	-
1957	-	-	-	-	-	-
1958	..	1	..	-	-	-
1959	..	3	..	-	-	-
1960	..	2	..	*	10	14.5
1961	..	3	..	-	-	-
1962	7	2	.34	-	-	-
1963	18	8	.42	-	-	-
1964	1,706	262	.15	-	-	-

Table 30
(Cont'd)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
<u>3. United States</u>						
1953	..	682	..	9	31	.4
1954	..	1,049	..	45	6,888	15.1
1955	..	1,088	..	2	399	16.5
1956	..	1,001	..	10	1,915	18.8
1957	..	950	..	2	300	15.2
1958	..	1,381	..	7	1,230	18.5
1959	..	1,728	..	14	2,650	18.7
1960	..	1,402	..	22	3,913	18.0
1961	..	1,717	..	44	7,460	16.9
1962	8,657	1,512	.17	80	13,806	17.3
1963	8,825	1,538	.17	52	8,587	16.7
1964	11,576	2,099	.18	157	26,497	16.9
<u>4. Germany, Fed. Rep. of</u>						
1953	-	-	-	-	-	-
1954	..	*	..	-	-	-
1955	..	100	..	-	-	-
1956	..	146	..	-	-	-
1957	..	105	..	*	24	15.1
1958	..	143	..	-	-	-
1959	..	217	..	-	-	-
1960	..	136	..	*	46	15.1
1961	..	188	..	7	1,055	15.0
1962	916	237	.26	6	973	15.0
1963	922	254	.28	17	2,615	15.0
1964	1,076	269	.25	20	3,019	14.9

(a) Beginning in 1964 renumbered as s.c. 407-80, "Fatty alcohols n.e.s., including sulphonated", which includes parts of s.c. 8415 and 8422; also included in s.c. 395-99, "Mixtures, residues and derivatives of oils, fats and waxes n.e.s."

Table 31

Imports: Glycerine, crude, for the manufacture of refined glycerine,
s.c. 8402(a)

Tariff Item 664(1)

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	1,434	450	.31	-	-	-
1954	2,753	558	.20	-	-	-
1955	5,538	1,161	.21	-	-	-
1956	4,896	883	.18	-	-	-
1957	5,154	863	.17	-	-	-
1958	6,542	1,140	.17	-	-	-
1959	8,509	1,668	.20	-	-	-
1960	6,807	1,361	.20	-	-	-
1961	6,447	942	.15	-	-	-
1962	5,559	737	.13	-	-	-
1963	6,804	835	.12	-	-	-
1964	8,207	1,307	.16	8	637	7.9
<u>2. United States</u>						
1953	1,434	450	.31	-	-	-
1954	2,753	558	.20	-	-	-
1955	4,366	947	.22	-	-	-
1956	4,896	883	.18	-	-	-
1957	4,513	778	.17	-	-	-
1958	5,379	970	.18	-	-	-
1959	8,324	1,638	.20	-	-	-
1960	6,716	1,345	.20	-	-	-
1961	6,175	908	.15	-	-	-
1962	5,417	721	.13	-	-	-
1963	6,804	835	.12	-	-	-
1964	8,207	1,307	.16	8	637	7.9

(a) Beginning in 1964 renumbered as s.c. 429-48,
 "Glycerin, crude n.e.s."

Table 32

Imports: Glycerine, for the manufacture of explosives, s.c. 8403^(a)

Tariff Item 664(2)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>
	(000)	(000)	\$/lb.
<u>1. Total</u>			
1953	1,443	538	.37
1954	1,575	458	.29
1955	1,631	472	.29
1956	1,193	344	.29
1957	2,474	580	.23
1958	821	211	.26
1959	984	261	.26
1960	807	224	.28
1961	596	147	.25
1962	587	141	.24
1963	897	179	.20
1964	1,664	379	.23
<u>2. United States</u>			
1953	911	347	.38
1954	1,575	458	.29
1955	1,151	342	.30
1956	1,193	344	.29
1957	1,676	425	.25
1958	821	211	.26
1959	984	261	.26
1960	807	224	.28
1961	596	147	.25
1962	587	141	.24
1963	897	179	.20
1964	1,664	379	.23

(a) Beginning in 1964, renumbered as s.c. 429-47

Table 33

Imports: Glycerine, n.o.p., s.c. 8404 (a)

Tariff Items 208t and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	<u>Dutiable</u>
				(000)		<u>Value</u>
<u>1. Total</u>						
1953	875	260	.30	256	48,574	19.0
1954	193	60	.31	60	11,989	20.0
1955	623	183	.29	183	36,652	20.0
1956	626	186	.30	185	36,995	20.0
1957	349	93	.27	93	18,588	20.0
1958	302	83	.27	83	16,529	20.0
1959	431	117	.27	117	23,415	20.0
1960	522	149	.29	139	27,779	20.0
1961	456	113	.25	113	22,448	19.9
1962	519	118	.23	118	27,082	23.0
1963	950	193	.20	192	39,462	20.6
1964	2,558	756	.30	754	79,662	10.6
<u>2. United States</u>						
1953	737	209	.28	204	40,847	20.0
1954	193	60	.31	60	11,989	20.0
1955	623	183	.29	183	36,652	20.0
1956	626	186	.30	185	36,995	20.0
1957	227	64	.28	64	12,767	20.0
1958	290	79	.27	79	15,880	20.0
1959	431	117	.27	117	23,415	20.0
1960	522	149	.29	139	27,779	20.0
1961	456	113	.25	113	22,448	19.9
1962	519	118	.23	118	27,082	23.0
1963	949	192	.20	192	39,462	20.6
1964	2,480	729	.29	729	78,431	10.8

(a) Beginning in 1964 renumbered as s.c. 429-49,
"Glycerin, refined n.e.s."

Table 34

Imports: Ethyl or methyl alcohols or mixtures of methyl alcohol,
s.c. 8036(a)

Tariff Items 156(6), 157, 158, 158a, 158b, 203g and 875a

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	gal. (000)	\$ (000)	Value \$/gal.	Value \$ (000)	Collected \$	p.c. of Dutiable Value
<u>1. Total</u>						
1953	1,920	502	.26	129	104,165	81.0
1954	4,920	906	.18	26	17,460	67.5
1955	1,817	337	.19	26	14,207	54.5
1956	3,739	731	.20	23	12,450	54.5
1957(b)	1,697	519	.31	23	6,396	27.6
1958	1,872	540	.29	39	28,658	72.9
1959	3,298	945	.29	20	4,115	20.6
1960	58	39	.66	23	4,330	18.5
1961	1,094	323	.30	25	4,747	19.1
1962	1,281	410	.32	17	4,666	27.7
1963	898	289	.32	19	5,773	29.7
1964(a)	6,315	276	.04	13	5,368	41.5
<u>2. United States</u>						
1953	1,918	501	.26	128	103,865	81.1
1954	4,920	906	.18	26	17,460	67.5
1955	216	67	.31	26	14,207	54.5
1956	3,736	730	.20	22	11,877	54.3
1957(b)	1,697	519	.31	23	6,396	27.6
1958	1,872	540	.29	39	28,658	72.9
1959	3,298	945	.29	20	4,115	20.6
1960	58	39	.66	23	4,330	18.5
1961	1,094	323	.30	25	4,747	19.1
1962	1,281	410	.32	17	4,666	27.7
1963	898	289	.32	19	5,773	29.7
1964(a)	6,315	276	.04	13	5,368	41.5

(a) Beginning in 1964 renumbered as s.c. 407-05, "Methyl alcohol" (units in '000 lb. and unit value in \$/lb.); ethyl alcohol imports included in s.c. 407-99, and 429-99

(b) Prior to 1958 unit of quantity was proof gallon

Imports: Menthol, natural or synthetic, s.c. 8078^(a)

Tariff Item 264c

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>
<u>1. Total</u>			
1953 ^(b)	..	179,541	..
1954	..	212,216	..
1955	..	341,615	..
1956	..	143,173	..
1957	..	231,950	..
1958	..	236,939	..
1959	..	291,916	..
1960	..	252,516	..
1961	..	363,898	..
1962	..	365,676	..
1963	..	295,088	..
1964 ^(c)	83,500	274,456	3.29
<u>2. United Kingdom</u>			
1953	..	2,539	..
1954	..	24,399	..
1955	..	29,477	..
1956	..	5,584	..
1957	..	12,720	..
1958	..	20,615	..
1959	..	37,682	..
1960	..	62,229	..
1961	..	20,883	..
1962	..	34,049	..
1963	-	-	-
1964	1,300	5,315	4.09
<u>3. United States</u>			
1953 ^(b)	..	42,919	..
1954	..	31,265	..
1955	..	58,847	..
1956	..	47,846	..
1957	..	61,538	..
1958	..	46,248	..
1959	..	33,340	..
1960	..	41,026	..
1961	..	39,743	..
1962	..	65,502	..
1963	..	33,504	..
1964 ^(c)	7,400	19,949	2.70

Table 35
(Cont'd)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u> <u>\$/lb.</u>
<u>4. Brazil</u>			
1953	..	60,273	..
1954	..	16,361	..
1955	..	30,438	..
1956	..	41,595	..
1957	..	100,050	..
1958	..	91,403	..
1959	..	63,492	..
1960	..	46,589	..
1961	..	135,126	..
1962	..	145,294	..
1963	..	150,726	..
1964	52,400	161,367	3.08
<u>5. China</u>			
1953	..	13,848	..
1954	..	22,292	..
1955	..	61,874	..
1956	..	30,389	..
1957	..	5,783	..
1958	..	33,266	..
1959	..	34,825	..
1960	-	-	-
1961	..	13,454	..
1962	..	19,984	..
1963	..	68,648	..
1964	14,100	59,401	4.21
<u>6. Taiwan</u>			
1953	-	-	-
1954	-	-	-
1955	-	-	-
1956	-	-	-
1957	..	3,677	..
1958	..	2,403	..
1959	..	25,211	..
1960	..	22,991	..
1961	..	69,397	..
1962	..	41,463	..
1963	..	16,714	..
1964	3,600	12,503	3.47

Table 35
(Cont'd)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>
	lb.	\$	<u>Value</u>
			<u>\$/lb.</u>
<u>7. Hong Kong</u>			
1953	..	26,814	..
1954	..	53,785	..
1955	..	126,171	..
1956	-	-	-
1957	-	-	-
1958	-	-	-
1959	-	-	-
1960	-	-	-
1961	..	21,784	..
1962	..	4,376	..
1963	..	10,323	..
1964	3,900	13,428	3.44

(a) Beginning in 1964 renumbered as s.c. 407-65

(b) In 1953 \$827 worth of dutiable imports came from the United States; the duty collected was \$83

(c) In 1964 \$649 worth of dutiable imports came from the United States; the duty collected was \$48

Table 36

Imports: Acid, cresylic, s.c. 8015^(a)

Tariff Items 208e, 216 and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	589	48	.08	35	5,540	15.6
1954	382	31	.08	25	4,071	16.0
1955	623	54	.09	41	6,556	15.8
1956	441	54	.12	31	4,977	15.9
1957	429	65	.15	28	4,543	16.4
1958	464	56	.12	35	5,768	16.5
1959	689	66	.10	58	10,328	17.8
1960	651	80	.12	71	13,948	19.7
1961	768	89	.12	83	16,477	19.8
1962	888	112	.13	101	22,033	21.8
1963	930	119	.13	114	22,393	19.7
1964	991	129	.13	110	20,812	18.9
<u>2. United Kingdom</u>						
1953	475	38	.08	26	3,927	15.0
1954	255	19	.07	14	2,082	15.0
1955	489	42	.09	30	4,511	15.0
1956	269	25	.09	20	2,941	15.0
1957	242	22	.09	16	2,398	15.0
1958	305	27	.09	23	3,407	15.0
1959	375	32	.08	25	3,731	15.0
1960	143	13	.09	4	571	15.0
1961	79	8	.10	3	442	15.0
1962	123	13	.10	4	688	16.8
1963	187	22	.12	19	2,851	15.1
1964	245	30	.12	11	1,599	14.9
<u>3. United States</u>						
1953	114	10	.09	9	1,613	17.4
1954	127	12	.09	12	1,989	17.2
1955	134	12	.09	11	2,045	18.0
1956	172	29	.17	12	2,036	17.4
1957	188	43	.23	12	2,145	18.2
1958	159	28	.18	12	2,361	19.2
1959	314	34	.11	33	6,597	19.9
1960	507	67	.13	67	13,377	20.0
1961	689	81	.12	80	16,035	20.0
1962	764	100	.13	97	21,345	22.0
1963	743	97	.13	95	19,542	20.6
1964	747	99	.13	99	19,213	19.4

(a) Beginning in 1964 renumbered as s.c. 408-04

Table 37

Imports: Acid, carbolic, or phenol, s.c. 8027^(a)

Tariff Items 216, 711 and 922

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	11,899	2,153	.18	67	10,055	15.0
1954	7,934	1,232	.16	103	20,585	19.9
1955	8,060	1,285	.16	2	402	18.4
1956	6,898	1,181	.17	155	30,343	19.6
1957	4,355	755	.17	298	59,574	20.0
1958	3,599	636	.18	320	63,555	19.9
1959	6,614	1,070	.16	309	61,742	20.0
1960	4,790	749	.16	390	78,011	20.0
1961	3,604	585	.16	122	24,326	20.0
1962	2,128	313	.15	55	11,847	21.7
1963	726	90	.12	-	-	-
1964	463	53	.11	22	4,417	20.0
<u>2. United States</u>						
1953	11,899	2,153	.18	67	10,055	15.0
1954	7,928	1,231	.16	103	20,585	19.9
1955	8,060	1,285	.16	2	402	18.4
1956	6,898	1,181	.17	155	30,343	19.6
1957	4,355	755	.17	298	59,574	20.0
1958	3,599	636	.18	320	63,555	19.9
1959	6,614	1,070	.16	309	61,742	20.0
1960	4,790	749	.16	390	78,011	20.0
1961	3,604	585	.16	122	24,326	20.0
1962	2,128	313	.15	55	11,847	21.7
1963	726	90	.12	-	-	-
1964	463	53	.11	22	4,417	20.0

(a) Beginning in 1964 renumbered as s.c. 408-02, and includes Tariff Item 791

Table 38

Imports: Cresols, s.c. 408-03^(a)

Tariff Items 711 and 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	962	527	.55	295	44,273	15.0
<u>2. United Kingdom</u>						
1964	311	194	.63	-	-	-
<u>3. United States</u>						
1964	651	333	.51	295	44,273	15.0

^(a) Prior to 1964 included in s.c. 8415 and 8422

Table 39

Imports: Resorcinol, s.c. 408-11^(a)

Tariff Items 208t and 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	830	516	.62	16	2,407	14.9
<u>2. United Kingdom</u>						
1964	12	2	.20	-	-	-
<u>3. United States</u>						
1964	471	294	.62	7	970	14.9
<u>4. Germany, Fed. Rep. of</u>						
1964	337	210	.62	3	503	14.9

^(a) Prior to 1964 included in s.c. 8415 and 8422

Table 40

Imports: Di-tertiary butyl-para-cresol, s.c. 408-18^(a)

Tariff Item 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u> <u>p.c. of</u> <u>Dutiable</u> <u>Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
				(000)		
<u>1. Total</u>						
1964	64	37	.58	37	7,413	20.0
<u>2. United States</u>						
1964	64	37	.58	37	7,413	20.0

(a) Prior to 1964 included in s.c. 8415

Table 41

Imports: Phenols, phenol-alcohols and their derivatives, n.e.s.
s.c. 408-19(a)

Tariff Items 203f, 208t, 216, ex. 216, 219a(2), 711 and 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u> <u>p.c. of</u> <u>Dutiable</u> <u>Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
				(000)		
<u>1. Total</u>						
1964	4,262	1,899	.45	720	114,528	15.9
<u>2. United Kingdom</u>						
1964	647	296	.46	1	128	15.0
<u>3. United States</u>						
1964	2,998	1,395	.47	590	94,359	16.0

(a) Prior to 1964 included in s.c. 8022, 8073, 8415 and 8422

Table 42

Imports: Phenols, chlorinated, s.c. 408-15^(a)

Tariff Items 219a(2) and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	1,686	834	.49	51	5,476	10.7
<u>2. United Kingdom</u>						
1964	104	40	.39	-	-	-
<u>3. United States</u>						
1964	1,316	625	.47	51	5,476	10.7
<u>4. Germany, Fed. Rep. of</u>						
1964	242	165	.68	-	-	-

(a) Prior to 1964 included in s.c. 8073 and 8415

Table 43

Imports: Sulphuric ether; preparations of vinyl ether for
anaesthetic purposes, s.c. 8411(a)

Tariff Item 219d(2)

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	lb.	\$	Value	Value	Collected	p.c. of
	(000)	(000)	\$/lb.	\$	\$	Dutiable
				(000)		Value
<u>1. Total</u>						
1953	574	253	.44	251	50,105	20.0
1954	1,197	322	.27	315	62,988	20.0
1955	11,268	737	.07	445	88,941	20.0
1956	849	132	.16	123	24,544	20.0
1957	490	98	.20	91	18,123	20.0
1958	432	104	.24	96	19,184	20.0
1959	639	121	.19	116	23,139	20.0
1960	561	117	.21	114	22,731	20.0
1961	719	119	.17	114	22,634	19.9
1962	817	131	.16	123	24,619	20.0
1963	744	120	.16	117	23,581	20.1
<u>2. United States</u>						
1953	573	252	.44	251	50,105	20.0
1954	1,195	321	.27	315	62,988	20.0
1955	11,266	736	.07	445	88,941	20.0
1956	848	131	.15	123	24,544	20.0
1957	486	96	.20	91	18,123	20.0
1958	432	104	.24	96	19,184	20.0
1959	639	121	.19	116	23,139	20.0
1960	561	117	.21	114	22,731	20.0
1961	719	119	.17	114	22,634	19.9
1962	817	131	.16	123	24,619	20.0
1963	744	120	.16	117	23,581	20.1

(a) Beginning in 1964 included in s.c. 408-39

Table 44

Imports: Ethers, alcohol peroxides, ether peroxides, epoxides,
acetals, hemiacetals and derivatives, s.c. 408-39^(a)

Tariff Items 208t, 219d(2), 219e, 711, 791 and 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	Duty as p.c. of Dutiable Value
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
<u>1. Total</u>						
1964	10,327	2,614	.25	1,235	228,275	18.5
<u>2. United Kingdom</u>						
1964	50	32	.64	*	11	2.2
<u>3. United States</u>						
1964	10,211	2,516	.25	1,170	217,448	18.6

(a) Prior to 1964 included in s.c. 8071, 8073, 8411, 8415 and 8422

Table 45

Imports: Formaldehyde, containing not more than 15% of alcohol,
s.c. 8401(a)

Tariff Item 219b

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>
	(000)	(000)	\$/lb.
<u>1. Total</u>			
1953	26,459	919	.03
1954	7,759	307	.04
1955	5,452	204	.04
1956	7,115	272	.04
1957	6,617	255	.04
1958	6,638	241	.04
1959	4,414	154	.03
1960	10,735	396	.04
1961	6,530	276	.04
1962	2,603	116	.04
1963	5,531	264	.05
1964(b)	5,075	300	.06
<u>2. United States</u>			
1953	26,447	918	.03
1954	7,749	306	.04
1955	5,418	197	.04
1956	7,108	272	.04
1957	6,615	255	.04
1958	6,631	240	.04
1959	4,414	154	.03
1960	10,687	394	.04
1961	6,530	276	.04
1962	2,603	116	.04
1963	5,531	264	.05
1964(b)	5,075	300	.06

(a) Beginning in 1964 renumbered as s.c. 408-45, "Formaldehyde and paraformaldehyde"; also includes part of former s.c. 8422

(b) In 1964 \$32,597 worth of dutiable imports came from the U.S.A.; the duty collected was \$4,883

Imports: Vanillin, s.c. 8414 ^(a)

Tariff Items 208t and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	7	32	4.57	11	1,715	16.0
1954	5	22	4.19	6	985	17.3
1955	9	39	4.27	24	3,637	15.4
1956	5	22	4.08	13	2,074	15.9
1957	10	41	4.16	14	2,227	15.4
1958	5	21	4.12	9	1,539	16.2
1959	8	31	3.71	10	1,614	16.6
1960	4	17	3.75	8	1,367	16.2
1961	6	21	3.38	10	1,473	15.2
1962	64	160	2.51	148	26,240	17.8
1963	94	174	1.85	161	47,800	29.7
1964	44	108	2.45	70	16,729	23.7
<u>2. United Kingdom</u>						
1953	6	29	4.63	8	1,269	15.0
1954	5	19	4.27	3	410	15.0
1955	6	24	4.06	9	1,347	15.0
1956	4	15	4.04	6	847	15.0
1957	9	36	4.12	9	1,406	15.0
1958	4	16	4.19	4	619	15.0
1959	7	27	3.73	5	737	15.0
1960	4	13	3.61	5	696	15.0
1961	6	21	3.42	9	1,388	15.0
1962	3	13	3.82	1	243	20.0
1963	3	14	4.20	*	44	15.0
1964	8	37	4.60	*	28	14.8
<u>3. United States</u>						
1953	1	2	3.91	2	446	19.5
1954	1	3	3.71	3	575	19.5
1955	3	15	4.68	15	2,290	15.6
1956	1	5	3.71	5	833	17.2
1957	*	2	3.30	2	287	18.1
1958	1	2	2.91	2	466	20.0
1959	1	3	3.05	3	609	20.0
1960	*	1	7.99	1	166	20.0
1961	*	*	2.02	*	85	20.0
1962	60	146	2.43	146	25,997	17.8
1963	90	158	1.76	158	47,333	29.9
1964	31	49	1.59	49	13,386	27.4

(a) Beginning in 1964 renumbered as s.c. 408-56; also includes part of s.c. 8415

Table 47

Imports: Nitrous ether, sweet spirits of nitre and aromatic spirits
of ammonia, s.c. 8409(a)

Tariff Item 159b

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u> <u>Value</u>	<u>Dutiable</u> <u>Value</u>	<u>Duty</u> <u>Collected</u>	<u>Duty as</u> <u>p.c. of</u> <u>Dutiable</u> <u>Value</u>
	<u>gal.</u>	<u>\$</u>	<u>\$/gal.</u>	<u>\$</u>	<u>\$</u>	
<u>1. Total</u>						
1953	125	1,380	11.04	1,380	789	57.2
1954	23	459	19.96	459	207	45.1
1955	51	636	12.47	636	344	54.1
1956	54	985	18.24	985	458	46.5
1957	27	289	10.70	289	168	58.1
<u>2. United States</u>						
1953	89	1,224	13.75	1,224	634	51.8
1954	23	459	19.96	459	207	45.1
1955	27	541	20.04	541	243	44.9
1956	54	985	18.24	985	458	46.5
1957	10	173	17.30	173	82	47.4

(a) Beginning in 1958 included in s.c. 8415

Table 48

Imports: Aldehyde-function compounds n.e.s., s.c. 408-59^(a)

Tariff Items 208t, 711 and 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	2,444	578	.24	211	30,229	14.3
<u>2. United Kingdom</u>						
1964	79	65	.83	-	-	-
<u>3. United States</u>						
1964	2,337	495	.21	193	27,720	14.4

^(a) Prior to 1964 included in s.c. 8415 and 8422

Imports: Acetone, s.c. 8389^(a)

Tariff Items 166 and ex 166

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	195	173	43,242	24.9
1954	10	5	1,140	25.1
1955	7	6	1,567	25.0
1956	8	5	1,292	25.0
1957	10	9	2,245	25.0
1958	9	7	1,679	25.0
1959	10	9	2,142	25.0
1960	24	23	5,733	24.5
1961	20	12	3,122	25.1
1962	18	15	3,794	25.1
1963	18	14	3,571	25.0
<u>2. United States</u>				
1953	194	173	43,220	25.0
1954	10	5	1,140	25.1
1955	7	6	1,567	25.0
1956	8	5	1,292	25.0
1957	10	9	2,245	25.0
1958	9	7	1,679	25.0
1959	10	9	2,142	25.0
1960	24	23	5,733	24.5
1961	20	12	3,122	25.1
1962	18	15	3,794	25.1
1963	18	14	3,571	25.0

^(a) Beginning in 1964 included in s.c. 408-89

Imports: Methyl ethyl ketone and isopropyl acetate; diethyl ketone, methyl normal propyl ketone and blends thereof; methyl isobutyl ketone and furfural, s.c. 8035(a)

Tariff Items 208t, 208v, 263b and 833

Year	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	lb.	\$	\$/lb.	\$	\$	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	4,394	619	.14	209	52,135	25.0
1954	3,978	535	.13	226	56,507	25.0
1955	5,219	753	.14	281	60,159	21.4
1956	4,964	616	.12	277	65,759	23.8
1957	5,729	731	.13	303	75,065	24.8
1958	4,341	539	.12	156	38,200	24.5
1959	2,019	251	.12	58	13,039	22.6
1960	2,407	292	.12	112	26,611	23.8
1961	1,892	238	.13	139	32,750	23.5
1962	2,765	357	.13	179	43,475	24.3
1963	2,231	288	.13	152	34,434	22.7

2. United States

1953	4,394	619	.14	209	52,135	25.0
1954	3,978	535	.13	226	56,507	25.0
1955	5,219	753	.14	281	60,159	21.4
1956	4,964	616	.12	277	65,759	23.8
1957	5,729	731	.13	303	75,065	24.8
1958	4,341	539	.12	156	38,200	24.5
1959	2,019	251	.12	58	13,039	22.6
1960	2,405	291	.12	111	26,482	23.8
1961	1,892	238	.13	139	32,750	23.5
1962	2,765	357	.13	179	43,475	24.3
1963	2,231	288	.13	152	34,434	22.7

(a) Beginning in 1964, included in s.c. 408-09 and 408-75

Imports: Camphor, natural or synthetic, s.c. 8394 (a)

Tariff Item 264b

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
<u>1. Total</u>						
1953	114	58	.50	58	2,886	5.0
1954	97	53	.54	53	2,649	5.0
1955	92	52	.56	52	2,584	5.0
1956	111	57	.51	52	2,575	5.0
1957	132	83	.63	78	3,902	5.0
1958	97	47	.48	40	1,979	5.0
1959	84	42	.50	40	2,164	5.5
1960	131	64	.49	62	3,194	5.2
1961	58	30	.53	27	1,367	5.0
1962	92	49	.52	49	2,430	5.0
1963	119	60	.51	60	3,008	5.0
<u>2. United States</u>						
1953	112	56	.51	56	2,822	5.0
1954	79	45	.57	45	2,244	5.0
1955	62	39	.63	39	1,934	5.0
1956	58	33	.58	33	1,670	5.0
1957	85	62	.73	62	3,092	5.0
1958	39	22	.55	22	1,087	5.0
1959	37	22	.59	22	1,276	5.8
1960	37	22	.61	22	1,212	5.5
1961	33	20	.60	20	990	5.0
1962	32	22	.70	22	1,099	5.0
1963	31	20	.66	20	1,029	5.0
<u>3. Germany, Fed. Rep. of</u>						
1953	2	1	.38	1	42	5.0
1954	16	6	.38	6	299	5.0
1955	30	13	.43	13	650	5.0
1956	34	14	.42	14	723	5.0
1957	32	15	.46	15	726	5.0
1958	36	15	.43	15	763	5.0
1959	37	16	.43	16	789	5.0
1960	86	38	.45	38	1,921	5.0
1961	14	6	.42	6	294	5.0
1962	51	22	.43	22	1,106	5.0
1963	76	34	.45	34	1,699	5.0

(a) Beginning in 1964 included in s.c. 408-89

Table 52

Imports: Ketone and quinone function compounds n.e.s., s.c. 408-89^(a)

Tariff Items 166, ex. 166, 208t, 208z, 263b, 264b, 711 and 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u> <u>p.c. of</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	<u>(000)</u>	<u>(000)</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	<u>Value</u>
				<u>(000)</u>		
	<u>1. Total</u>					
1964	2,454	725	.30	415	58,998	14.2
	<u>2. United Kingdom</u>					
1964	217	130	.60	-	-	-
	<u>3. United States</u>					
1964	2,156	549	.25	376	56,486	15.0

^(a) Prior to 1964 included in s.c. 8035, 8389, 8394, 8415 and 8422

Table 53

Imports: Methyl ethyl ketone, s.c. 408-75^(a)

Tariff Items 208v, 263b and 833

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u> <u>p.c. of</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	<u>(000)</u>	<u>(000)</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	<u>Value</u>
				<u>(000)</u>		
	<u>1. Total</u>					
1964	795	98	.12	96	24,021	25.0
	<u>2. United States</u>					
1964	795	98	.12	96	24,021	25.0

^(a) Prior to 1964 included in s.c. 8035

Table 54

Imports: Hydrocarbons and their derivatives n.e.s., s.c. 406-99^(a)

Tariff Items various

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	43,723	4,415	.10	3,384	622,811	18.4
<u>2. United Kingdom</u>						
1964	1,463	253	.17	13	1,850	14.8
<u>3. United States</u>						
1964	40,626	3,891	.10	3,208	591,302	18.4

^(a) Prior to 1964 included in various statistical classes

Table 55

Imports: Alcohols and their derivatives n.e.s., s.c. 407-99^(a)

Tariff Items various

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	14,518	2,649	.18	1,089	195,586	18.0
<u>2. United Kingdom</u>						
1964	465	104	.22	12	1,773	15.0
<u>3. United States</u>						
1964	13,993	2,526	.18	1,072	193,097	18.0

^(a) Prior to 1964 included in various statistical classes

Table 1

Exports: Hydrocarbons and their derivatives, s.c. 414-19^(a)

<u>Year</u>	<u>Quantity</u> cwt.	<u>Value</u> \$	Unit <u>Value</u> \$/cwt.
1961	1,323,817	7,315,843	5.53
1962	1,979,023	10,371,676	5.24
1963	2,244,137	9,439,873	4.21
1964	2,280,180	10,868,234	4.77
1965	2,997,858	12,951,053	4.32

^(a) Not available prior to 1961

Table 2

Exports: Alcohols and their derivatives, s.c. 414-29^(a)

<u>Year</u>	<u>Quantity</u> cwt.	<u>Value</u> \$	Unit <u>Value</u> \$/cwt.
1961	343,172	6,393,853	18.63
1962	509,816	8,172,798	16.03
1963	555,381	8,025,862	14.45
1964	958,763	13,289,463	13.86
1965	749,572	11,056,484	14.75

^(a) Not available prior to 1961

Table 3

Exports: Glycerine, crude or refined, s.c. 8440^(a)

<u>Year</u>	<u>Quantity</u> cwt.	<u>Value</u> \$	<u>Unit</u> <u>Value</u> \$/cwt.
1953	4,384	105,188	23.99
1954	5,956	125,520	21.07
1955	6	200	33.33
1956	2,449	47,523	19.41
1957	-	-	-
1958	-	-	-
1959	-	-	-
1960	-	-	-

(a) Beginning in 1961 included in s.c. 429-99

Table 4

Exports: Wood alcohol, s.c. 8050^(a)

<u>Year</u>	<u>Quantity</u> gal.	<u>Value</u> \$	<u>Unit</u> <u>Value</u> \$/gal.
1953	-	-	-
1954	580,822	168,672	.29
1955	1,521,646	429,735	.28
1956	140,890	44,379	.31
1957	1,350	657	.49
1958	-	-	-
1959	1,196	1,442	1.21
1960	16,530	16,015	.97

(a) Beginning in 1961 included in s.c. 414-29

Table 5

Exports: Non-potable spirits, n.o.p., s.c. 8060^(a)

<u>Year</u>	<u>Quantity</u> gal.	<u>Value</u> \$	<u>Unit</u> <u>Value</u> \$/gal.
1953	91,721	19,254	.21
1954	133,688	191,440	1.43
1955	399,328	332,310	.83
1956	451,054	438,609	.97
1957	406,505	403,957	.99
1958	402,449	408,986	1.02
1959	502,867	533,272	1.06
1960	572,727	577,918	1.01

(a) Beginning in 1961 included in s.c. 414-29

Table 6

Exports: Phenols, phenol alcohols and their derivatives, s.c. 408-19^(a)

<u>Year</u>	<u>Quantity</u> cwt.	<u>Value</u> \$	<u>Unit</u> <u>Value</u> \$/cwt.
1962	136,081	1,324,864	9.74
1963	104,773	1,182,681	11.29
1964	123,782	1,534,466	12.40
1965	178,827	2,307,551	12.90

(a) Not available prior to 1962

Table 7

Exports: Ethers, alcohol peroxides, ether peroxides, epoxides, acetals, hemiacetals and derivatives, s.c. 408-39^(a)

<u>Year</u>	<u>Quantity</u> cwt.	<u>Value</u> \$	<u>Unit</u> <u>Value</u> \$/cwt.
1962	102,100	1,325,951	12.99
1963	79,403	1,046,938	13.19
1964	62,496	912,936	14.61
1965	10,941	150,647	13.77

(a) Not available prior to 1962

Table 8

Exports: Aldehyde-function compounds, s.c. 408-59^(a)

<u>Year</u>	<u>Quantity</u> cwt.	<u>Value</u> \$	<u>Unit</u> <u>Value</u> \$/cwt.
1961	99,052	2,821,104	28.48
1962	146,736	3,960,843	26.99
1963	34,908	4,166,139	119.35
1964	58,554	3,930,915	67.13
1965	66,928	4,665,668	69.71

(a) Not available prior to 1961. Beginning in 1962 includes part of s.c. 870-79

Table 9

Exports: Ketone-function and quinone-function compounds, s.c. 408-89^(a)

<u>Year</u>	<u>Quantity</u> cwt.	<u>Value</u> \$	<u>Unit</u> <u>Value</u> \$/cwt.
1961	132,390	825,799	6.24
1962	123,911	553,774	4.47
1963	55,041	308,399	5.60
1964	9,354	52,449	5.61
1965	1,768	27,383	15.49

(a) Not available prior to 1961

APPENDIX IIPrincipal Relevant Recommended Items

<u>Goods Subject to Duty and Free Goods</u>	<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
<p>R-2 156(6) - Spirituous or alcoholic liquors, n.o.p.; absinthe, arrack or palm spirit, artificial brandy and imitations of brandy, n.o.p.; cordials of all kinds, n.o.p.; mescal, pulque, rum shrub, schiedam and other schnapps; tafia, and alcoholic bitters or beverages, n.o.p.; and wines, n.o.p., containing more than forty per cent of proof spirit per gallon of the strength of proof and in addition thereto, under all tariffs, \$9.00 per gallon of the strength of proof</p>	\$5.00	\$10.00	\$10.00
<p>R-3 156(7) - Ethyl alcohol undenatured, denatured or specially denatured:</p> <p>(a) Ethyl alcohol for use as a spirituous or alcoholic beverage or for the manufacture of spirituous or alcoholic beverages, per gallon of the strength of proof and in addition thereto, under all tariffs, \$9.00 per gallon of the strength of proof</p> <p>(b) Ethyl alcohol denatured, or specially denatured, otherwise than in accordance with the specifications prescribed by the Excise Act and the Regulation made thereunder, per gallon of the strength of proof and in addition thereto, under all tariffs, \$9.00 per gallon of the strength of proof</p>	\$5.00	\$10.00	\$10.00

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
R-3 (Cont'd)	(c) Ethyl alcohol denatured, or specially denatured, in accordance with the specifications prescribed by the Excise Act and the Regulations made thereunder and ethyl alcohol, n.o.p.; the foregoing subject to such regulations as the Minister may prescribe, per gallon of the strength of proof and in addition thereto, under all tariffs, a rate of duty equal to the rate of duty applicable under the Excise Act to such alcohol if manufactured in Canada and sold or used in Canada.	10¢	20¢	40¢
R-15	213 - Vinegar	10	15	25
R-18	263b - Diethyl ketone, methyl normal propyl ketone and blends thereof; furfural; all the foregoing for use in the refining of oils	Free	Free	25
R-29	590 - Naphtha, high flash	Free	Free	Free
R-31	663b - Goods which enter into the cost of manufacture of fertilizers when imported for use exclusively in the manufacture of fertilizers	Free	Free	Free
R-40	Hexamethylenetetramine or metaldehyde put up in tablets, sticks or similar forms for use as fuels:			
	(1) Hexamethylenetetramine	10	15	25
	(2) Metaldehyde	Free	15	25
15.10	Industrial mixtures, including reaction blends, of fatty acids not containing 90 per cent or more by weight of any one acid; acid oils from refining, n.o.p.; industrial mixtures, including reaction blends, of fatty alcohols not containing 90 per cent or more by weight of any one alcohol:			
	(1) Acid oils	Free	10	25
	(2) Fatty acids except tall oil fatty acids	10	15	25
	(3) Fatty alcohols	Free	Free	Free
	(4) Tall oil fatty acids	Free	Free	Free

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
15.11	Glycerol and glycerol lyes:			
	(1) Other than the following	Free	Free	Free
	(2) Glycerol, other than crude	10	15	25
28.49	Colloidal precious metals; amalgams of precious metals; salts and other compounds, inorganic or organic, of precious metals, including albuminates, proteينات, tannates and similar compounds, whether or not chemically defined:			
	(1) Other than the following	Free	15	25
	(2) Amalgams of precious metals: gold irridium, osmium, palladium, platinum, rhodium, ruthenium and silver	15	20	25
	(3) Auric chloride (gold chloride)	10	15	25
	(4) Colloidal suspensions of precious metals: gold, iridium, osmium, palladium, platinum, rhodium, ruthenium and silver	15	20	25
	(5) Gold sodium cyanide	10	15	20
	(6) Silver bromide	10	15	20
	(7) Silver chloride	10	15	20
	(8) Silver cyanide	10	15	20
	(9) Silver iodide	10	15	20
	(10) Silver nitrate	10	15	20
28.56	Carbides (for example silicon carbide, boron carbide, metallic carbides):			
	(1) Other than the following	Free	15	25
	(2) Artificial abrasive grains, crushed or ground	Free	Free	Free
	(3) Calcium carbide	5	10	20
28.58	Other inorganic compounds (including distilled and conductivity water and water of similar purity); amalgams, except amalgams of precious metals:			
	(1) Other than the following	Free	15	25
	(2) Amalgams, except amalgams of precious metals	15	20	25
	(3) Calcium cyanamide containing, in the dry state, more than 25 per cent by weight of nitrogen	Free	Free	Free
	(4) Cyanogen bromide	Free	Free	Free

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
29.01	Hydrocarbons:			
(1)	Other than the following	Free	15	25
(2)	Acetylene	10	15	25
(3)	Benzene	Free	Free	Free
(4)	Butadiene	Free	Free	Free
(5)	Butanes	10	12½	25
(6)	Butylenes (butenes)	Free	Free	Free
(7)	Camphene	Free	Free	Free
(8)	Cyclopropane, for anaesthetic purposes	10	15	25
(9)	Dipentene	Free	Free	Free
(10)	Essential oils, natural or synthetic, of this item	Free	7½	7½
(11)	Ethylene	Free	Free	Free
(12)	Hexanes	Free	Free	Free
(13)	alpha Methylstyrene	10	15	25
(14)	Naphthalene	10	15	25
(15)	Deleted			
(16)	Pinenes	Free	Free	Free
(17)	Propane	10	12½	25
(18)	Propylene	Free	Free	Free
(19)	Styrene	10	15	25
(20)	p-Terphenyl	10	15	25
(21)	Toluene	Free	Free	Free
(22)	Xylenes	Free	Free	Free
29.02	Halogenated derivatives of hydrocarbons:			
(1)	Other than the following	Free	15	25
(2)	Carbon tetrachloride	10	15	25
(3)	Chlorofluoroethanes	10	15	25
(4)	Chlorofluoromethanes	10	15	25
(5)	ortho-Dichlorobenzene	10	15	25
(6)	para-Dichlorobenzene	10	15	25
(7)	Essential oils, natural or synthetic, of this item	Free	7½	7½
(8)	Ethyl chloride (chloroethane)	10	15	25
(9)	Ethylene dibromide	Free	Free	Free
(10)	Ethylene dichloride	10	15	25
(11)	Methyl chloride	10	15	25
(12)	Methylene chloride	10	15	25
(13)	Perchloroethylene	10	15	25
(14)	1,1,1,-Trichloroethane (methylchloroform)	10	15	25
(15)	Trichloroethylene	12½	17½	25
(16)	Vinyl chloride (monochloro-ethylene)	10	15	25

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
29.03	Sulphonated, nitrated or nitrosated derivatives of hydrocarbons:			
	(1) Other than the following	Free	15	25
	(2) Ammonium dodecylbenzene sulphonate	10	15	25
	(3) Ammonium xylene sulphonate	10	15	25
	(4) Dinitrotoluene	10	15	25
	(5) Dodecylbenzene sulphonic acid	10	15	25
	(6) Nitrobenzene	10	15	25
	(7) Potassium toluene sulphonate	10	15	25
	(8) Sodium dodecylbenzene sulphonate	10	15	25
	(9) Sodium toluene sulphonate	10	15	25
	(10) Sodium xylene sulphonate	10	15	25
	(11) Toluene sulphonic acid	10	15	25
	(12) Trinitrotoluene (TNT)	10	15	25
29.04	Acyclic alcohols and their halogenated, sulphonated, nitrated or nitrosated derivatives:			
	(1) Other than the following	Free	15	25
	(2) Amyl alcohols	Free	Free	Free
	(3) Butyl alcohols	10	15	25
	(4) Essential oils, natural or synthetic, of this item	Free	7½	7½
	(5) Ethylene glycol	10	10	25
	(6) Hexylene glycols	10	15	25
	(7) Isopropyl alcohol	10	15	25
	(8) Methyl alcohol	5	10	20
	(9) Methylamyl alcohol (methyl isobutyl carbinol)	10	15	25
	(10) 2-Methyl-2-n-propyl-1,3-propanedial	10	15	25
	(11) Octanols	10	15	25
	(12) Pentaerythritol	10	15	25
	(13) n-Propyl alcohol	10	15	25
	(14) Propylene glycol	10	15	25
	(15) Sorbitol	10	15	25
29.05	Cyclic alcohols and their halogenated, sulphonated, nitrated or nitrosated derivatives:			
	(1) Other than the following	Free	15	25
	(2) Cyclohexanol	10	15	25
	(3) Essential oils, natural or synthetic of this item	Free	7½	7½
	(4) Menthol	Free	Free	Free
	(5) Methylcyclohexanol	10	15	25
	(6) Terpineol	Free	Free	Free

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
29.06	Phenols and phenol-alcohols:			
	(1) Other than the following	Free	15	25
	(2) Bisphenol A	10	15	25
	(3) Butylated hydroxytoluene	10	15	25
	(4) Cresol, medicinal grade	10	15	25
	(5) ortho-Cresol	10	15	25
	(6) Didodecyl phenol	10	15	25
	(7) Dinonyl phenol	10	15	25
	(8) Dodecyl phenol	10	15	25
	(9) Essential oils, natural or synthetic, of this item	Free	7½	7½
	(10) Nonyl phenol	10	15	25
	(11) Phenol	10	15	25
	(12) Xylenols	10	15	25
29.07	Halogenated, sulphonated, nitrated or nitrosated derivatives of phenols or phenol-alcohols:			
	(1) Other than the following	Free	15	25
	(2) 2,4-Dichlorophenol	10	15	25
	(3) Pentachlorophenol	10	15	25
	(4) Phenolsulphonic acids	10	15	25
	(5) Sodium pentachlorophenate	10	15	25
29.08	Ethers, ether-alcohols, ether-phenols, ether-alcohol-phenols, alcohol per- oxides and ether peroxides, and their halogenated, sulphonated, nitrated or nitrosated derivatives:			
	(1) Other than the following	Free	15	25
	(2) tert-Butyl hydroperoxide	10	15	25
	(3) Cumene hydroperoxide	10	15	25
	(4) Di-tertiary-butyl peroxide	10	15	25
	(5) Dichloroethyl ether	10	15	25
	(6) Diethylene glycol	10	15	25
	(7) Diethylene glycol monobutyl ether	10	15	25
	(8) Diethylene glycol monoethyl ether	10	15	25
	(9) Diethylene glycol monomethyl ether	10	15	25
	(10) Dipentaerythritol	10	15	25
	(11) Dipropylene glycol	10	15	25
	(12) Essential oils, natural or synthetic, of this item	Free	7½	7½
	(13) Ether (diethyl ether)	10	15	25
	(14) Ethylene glycol monobutyl ether	10	15	25
	(15) Ethylene glycol monoethyl ether	10	15	25
	(16) Ethylene glycol monomethyl ether	10	15	25
	(17) Glycerol guaiacolate (guaiacol glyceryl ether)	10	15	25
	(18) Triethylene glycol	10	15	25
	(19) Triethylene glycol monobutyl ether	10	15	25
	(20) Triethylene glycol monoethyl ether	10	15	25
	(21) Triethylene glycol monomethyl ether	10	15	25
	(22) Trinitroanisole	10	15	25
	(23) Tripentaerythritol	10	15	25

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
29.09	Epoxides, epoxyalcohols, epoxyphenols and epoxyethers, with a three or four member ring and their halogenated, sulphonated, nitrated or nitrosated derivatives:			
	(1) Other than the following	Free	15	25
	(2) Epichlorohydrin	Free	Free	10
	(3) Ethylene oxide (epoxyethane)	10	15	25
	(4) Propylene oxide (1,2-epoxypropane)	10	15	25
29.10	Acetals and hemiacetals and single or complex oxygen-function acetals and hemiacetals, and their halogenated, sulphonated, nitrated or nitrosated derivatives:			
	(1) Other than the following	Free	15	25
	(2) Essential oils, natural and synthetic, of this item	Free	7½	7½
29.11	Aldehydes, aldehyde-alcohols, aldehyde-ethers, aldehyde-phenols and other single or complex oxygen-function aldehydes:			
	(1) Other than the following	Free	15	25
	(2) Acetaldehyde	10	15	25
	(3) Aldol (acetaldol)	10	15	25
	(4) n-Butyraldehyde	10	15	25
	(5) Crotonaldehyde	10	15	25
	(6) Essential oils, natural and synthetic, of this item	Free	7½	7½
	(7) 2-Ethyl-3-propylacrolein (2-ethylhex-2-enaldehyde)	10	15	25
	(8) Formaldehyde	5	10	20
	(9) Paraldehyde	10	15	25
	(10) Vanillin	10	15	25
29.12	Halogenated, sulphonated, nitrated or nitrosated derivatives of products falling within Recommended Item No. 29.11	Free	15	25
29.13	Ketones, ketone-alcohols, ketone-phenols, ketone-aldehydes, quinones, quinone-alcohols, quinone-phenols, quinone-aldehydes and other single or complex oxygen-function ketones and quinones, and their halogenated, sulphonated, nitrated or nitrosated derivatives:			
	(1) Other than the following	Free	15	25

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
29.13				
(Cont'd)	(2) Acetone	10	15	25
	(3) Camphor, natural or synthetic	Free	5	25
	(4) Diacetone alcohol	10	15	25
	(5) 3,6a-Dihydroxypregnan-20-one	10	15	25
	(6) Essential oils, natural or synthetic, of this item	Free	7½	7½
	(7) Ethylmethyl ketone	10	15	25
	(8) 12a-Hydroxypregnan-3, 20-dione	10	15	25
	(9) Isophorone	10	15	25
	(10) Menadione sodium bisulphite	10	15	25
	(11) Mesityl oxide	10	15	25
	(12) Methylisobutyl ketone	10	15	25
	(13) 5B-Pregnan-3a-ol-20-one	10	15	25
	(14) 11-Pregnen-3, 20-dione	10	15	25

APPENDIX IIITHE CLASSIFICATION OF CHEMICALS AND PRODUCTS OF PETROLEUM

Petroleum and natural gas are the starting point for the large family of chemicals often referred to collectively as "petrochemicals". The purpose of this appendix is to describe enough of the processes used in petroleum refining to make the discussion in the report more meaningful, and to provide a basis for distinguishing between petrochemicals and the products of petroleum for purposes of tariff classification.

Petroleum Processing

After having been lifted from deep beneath the earth's crust, crude oil must be refined to obtain from it those products which are useful as fuels, as lubricants and as the forerunners of the myriad of products that emerge from the chemical and allied industries.

Many processes are involved in the refining of crude oil. The most fundamental of these is distillation that depends upon the different boiling points of the many individual hydrocarbons of which crude oil is composed. Distillation, by dividing crude oil into its various fractions, provides the raw materials for all subsequent refinery operations. It is a technique of physically separating the many parts.

Distillation occurs in a still. The still of the petroleum industry is a series of horizontal trays fastened at intervals in a vertical cylindrical tower. Each tray acquires a different temperature in operation, the bottom one being hottest and the top coolest, enabling a different petroleum product to condense on each. In operation, crude oil is heated to a temperature of about 750°F. in pipes in a nearby furnace and is then discharged, under pressure, into the tower, near its base. At this temperature 60 to 70 per cent of the crude oil changes to vapour. The unvapourized part falls to the bottom of the tower to be pumped away as "reduced crude"; the vapours rush up the tower, condensing as liquids on the progressively cooler trays as they rise. The trays fill and overflow, the liquid passing down the tower until it reaches an area where some of the components are again converted to vapour which again travels up the tower. Particular products can be removed as side streams via taps on trays at appropriate levels. Thus the more readily vapourized components are continuously separated from those less easily vapourized. The several groups of products fractionally distilled from the vapourized crude may be grouped as follows:

- a) Naphthas: light naphthas are obtained by condensing the vapours leaving the top of the tower. These are used as components of aviation gasoline, motor gasoline, solvents, or reforming feed stock. A heavier naphtha for solvents, gasoline blending or reforming is withdrawn as a liquid from a tray near the top of the tower.

- b) Kerosene, also known as refined oil, illuminating oil or water white fraction, is withdrawn from a tray in the upper half of the tower.
- c) Gas oils: light gas oils are usually withdrawn as a side stream from a tray a few positions below the kerosene draw off; the heavy gas oil is removed from a tray slightly above the point where the crude petroleum feed enters the tower.

The reduced crude taken from the bottom of the tower may become feed for a vacuum distillation unit or may be a source of asphalt, coke, heavy residual oil or cracking stock for conversion to gasoline. A vacuum distillation unit is similar to the tower operating under atmospheric pressure, but the introduction of a vacuum enables the feed stock to distil at a lower temperature than is possible at atmospheric pressure. Distillation at lower temperature avoids the chemical destruction of the lubricating oil and wax components that would occur at the high temperature necessary under atmospheric conditions.

The vacuum distillation of reduced crude yields:

- a) Vacuum gas oil, used as feed stock for later catalytic cracking processes, or as very light lubricating oil.
- b) Raw lubricating oil distillates.
- c) Pitch (the bottom product) may be used directly as one grade of asphalt or processed into heavier grades or it may be blended with gas oil to make fuel oil.

Each of the side-stream products from either the vacuum or atmospheric distillation column is again fractionally distilled to remove undesirable components. The so-called "light ends" of refinery operations are produced at this point as a mixture of by-products consisting of the gaseous and more volatile liquid hydrocarbons. The individual components listed below are produced in only small quantities in the distillation of crude petroleum but in larger quantities during the subsequent cracking and reforming operations carried out to produce gasoline components.

Light Hydrocarbons

<u>Hydrocarbon</u>	<u>Boiling point</u>	<u>Chief use</u>
Methane	-259.5°F	Fuel gas
Ethane	-128.2	Fuel gas
Ethylene	-155.0	Fuel gas
Propane	-43.8	Synthetic chemicals Fuel gas
Propylene	-53.7	LPG Fuel gas
Iso-butane	10.9	Synthetic chemicals Gasoline
		Alkylate
		Motor gasoline

Light Hydrocarbons (Cont'd)

<u>Hydrocarbon</u>	<u>Boiling point</u>	<u>Chief use</u>
N-butane	31.1°F	Motor gasoline & LPG
Iso-butylene	20.0	Synthetic rubber Chemicals Gasoline Alkylate
Butylene-1	20.8	Synthetic rubber Chemicals
Butylene-2	33.8	Alkylate Gasoline
Iso-pentane	82.2	Gasoline
N-pentane	96.8	Gasoline
Pentylenes	86.2	Gasoline
Iso-hexane	140.5	Gasoline
N-hexane	155.7	Gasoline

The need to produce additional quantities of gasoline from a given quantity of crude oil to satisfy the demand created by the automobile led to the development of the process known as "cracking", which changes the heavier hydrocarbon molecules to lighter ones.

Petroleum hydrocarbons crack when they are subjected to temperatures in excess of 750°F. The larger the hydrocarbon molecule, the higher is the temperature required, and the longer the time of heating, the greater is the degree of decomposition that takes place. The conditions that control cracking are temperature, length of heating time, pressure, use of catalysts and the composition of the oil being cracked. Oil suitable for cracking may be almost any fraction obtained from crude, but the gas oils are most frequently used.

Cracking results in the production of large volumes of hydrocarbons whose chemical properties make them especially valuable for high octane gasoline and as the starting point for many petrochemicals.

A modern refinery also uses processes other than distillation and cracking to obtain from crude oil the products it wants. Reforming, whether thermal or catalytic, converts the low octane, heavier components of gasoline into components suitable for high octane gasoline. Many of the light gases produced in refinery operations can be polymerized or reacted together to form liquids suitable for use as gasoline components. In these processes two or more smaller hydrocarbon molecules combine to form larger molecules. An example is the combination of isobutylene and normal butylene to form a liquid product of very high octane number. Some of the constituents of refinery gases, such as propane and butane, are very stable and cannot be readily polymerized. Propane and normal butane are disposed of as commercial liquified petroleum gas (LPG) for use as fuel, while normal butane can also be cracked to ethylene. Alkylation is similar to polymerization but permits the refiner to combine an olefinic gas with a paraffinic gas to obtain, as the final product, a liquid paraffin called an alkylate. Some hydrocarbons can be converted to aromatics in a process known as aromatization; for example, normal hexane can become benzene, and toluene can be made from normal heptane. This change usually occurs as a part of other commercial catalytic processes rather than as a process in itself.

The families of hydrocarbons are listed below with some of their more important members.

<u>Paraffins</u>	<u>Olefins</u>	<u>Naphthenes</u>	<u>Aromatics</u>
Methane	Ethylene	Cyclopropane	Benzene
Ethane	Propylene	Cyclopentane	Toluene
Propane	Butylene	Cyclohexane	Xylene
Butanes	Butadiene		Ethyl benzene
Pentane	Acetylene		Styrene
Hexane			Naphthalene
Octane			Cumene

This system of classification parallels that of the Brussels Nomenclature in content but the family names are different. Where this system names paraffin hydrocarbons, the B.T.N. names saturated acyclic hydrocarbons; olefinic hydrocarbons correspond to the B.T.N.'s unsaturated acyclic hydrocarbons; naphthenes are the cyclanes and cyclenes in the B.T.N.; both systems use the term aromatic hydrocarbons. In addition to these four classes, the Brussels system has a fifth, cycloterpenes. These are not derived from petroleum sources but stem from such vegetable sources as pine trees and citrus fruit.

The term aliphatic, as used to describe hydrocarbons, applies to acyclic hydrocarbons, for instance those derived from the paraffin and olefin hydrocarbons as distinct from those containing the aromatic nucleus.

Petrochemicals

A petrochemical is a separate chemically defined compound derived completely or mainly from petroleum or natural gas, and can be further processed by chemical means. Most petrochemicals are organic chemicals; only a few, such as ammonia and sulphur and some of their derivatives, are inorganic. These inorganic products generally are also available from non-carbon sources and in commerce are seldom referred to as petrochemicals. Thus, petrochemicals are chemicals in which the prefix simply denotes the source and family relationship. In some instances the same chemical can be derived from another substance, for example coal, for many of the hydrocarbons.

Petroleum has become the most prolific source of organic chemicals because of its abundance and the ability of its derivatives to combine in a profusion of relationships. The manufacture of chemicals from petroleum and natural gas falls into two broad divisions. The segregation of the basic hydrocarbons and their conversion to such primary or intermediate chemical products as benzene and ethylene are generally carried out by petroleum or chemical companies, sometimes as joint enterprises, and have traditionally been thought of as petroleum operations. The conversion of the intermediates into more advanced chemicals, such as ethyl benzene, and into finished products is generally the work of chemical companies or fabricating companies such as those engaged in making textiles, synthetic rubber, paints and plastics.

It remains to provide the means to distinguish between petrochemicals and the products of petroleum, for purposes of this reference.

Classification

It was noted in the introduction to this chapter on organic chemicals that the Minister of Finance, in referring chemicals to the Board for study, specifically excluded petroleum products from the terms of reference. Because of the close association of these products with chemicals, it is necessary to develop some basis for distinguishing between them. Two bases for distinguishing between petrochemicals and products of petroleum are considered:

- a) Origin and method of manufacture
- b) Degree of separation, or purity

a) Origin and method of manufacture

The source of both petroleum products and petrochemicals is the crude oil or natural gas drawn from subterranean resources. Petroleum hydrocarbons produced in the normal course of refinery operations have frequently been regarded as the products of petroleum, and products of later processes, as petrochemicals. As discussed above, standard refinery processes include distillation and cracking, among others, and result in such products as naphtha, kerosene, gas oils and the light hydrocarbons like methane, ethane and ethylene, usually in mixed form. But other products may also be produced in a refinery if appropriate equipment is installed. For instance, benzene production in a Montreal refinery was made possible by the addition of a Udex solvent extraction unit. The equipment installed in a refinery or chemical plant is so much a matter of convenience and economy that a distinction between the two kinds of plants probably can no longer be adequately made. It is a relationship which is becoming continually more complex as companies extend their operations over a wider range of processes and products. Thus, even though this might have been fairly generally useful in the past, and might still permit some useful distinction to be made, the trend in the industry and in technology is to decrease its practical value as a means of demarcation.

b) Degree of Separation of Products, or Purity

The definition of a petrochemical noted earlier requires not only that the substance be derived from petroleum or natural gas but also that it be in a form suitable for a predictable chemical reaction. For predictable results to occur, the composition of the reaction materials must be known. The chemicals of this section of the report are derivatives of petroleum brought to a degree of refinement that makes them suitable for use in predictable chemical reactions. It is this further refinement that changes their classification from petroleum products to chemicals. Even so, a certain amount of arbitrariness remains in setting the limits for purposes of commerce.

The Board received various representations and carried out independent inquiries to determine the degree of purity which might usefully distinguish petroleum products from chemicals for the purposes of this study and for the administration of the Customs Tariff.

The Explanatory Notes to the Brussels Nomenclature indicate that, as a general rule, the relevant chemical classification is restricted to "separate chemically defined compounds" but they may contain impurities and added stabilizers. The Notes recognize five categories of basic hydrocarbons of heading 29.01:

- a) Saturated acyclic hydrocarbons
- b) Unsaturated acyclic hydrocarbons
- c) Cyclanes and cyclenes
- d) Cycloterpenes
- e) Aromatic hydrocarbons

These terms have been related above to the corresponding paraffins, olefins, naphthenes and aromatics in the description of petroleum refining. In the comments that follow, the Brussels Notes are related to the recommendations of the Industry Committee and to the discussion of such other interested parties as Imperial Oil Limited and Polymer Corporation Limited.

Brussels Classification

As noted above, the Brussels Explanatory Notes present five groupings under the heading 29.01, Hydrocarbons. In the definitions to the Nomenclature it is indicated that the products of the heading are to be separate chemically defined organic compounds which may contain impurities, and which may consist of mixtures of isomers of the same compound. However, apart from stereoisomers, mixtures of acyclic hydrocarbon isomers, whether or not saturated, are excluded from this heading, and are considered to be crude petroleum products of Chapter 27.(1)

Portions of the relevant Explanatory Notes on the individual groups under heading 29.01 are given below.

a) Saturated Acyclic Hydrocarbons

It was noted under petroleum processing that the basic hydrocarbon of this category is methane and that others are ethane, propane, butanes; Brussels Notes also include hexanes, heptanes, octanes, decanes, pentadecanes, triacontanes and hexacontanes. Methane is excluded from heading 29.01 and is classified as a petroleum gas of heading 27.11 regardless of its purity. For the other products of the group, the Notes stipulate that:

"To fall within the present heading [29.01] these saturated acyclic hydrocarbons must be in the form of separate, chemically defined compounds, whether obtained by refining the natural products or by synthesis. But the heading excludes crude butane, crude propane, crude petroleum gases and similar crude gaseous hydrocarbons of heading 27.11."(2)

- (1) Nomenclature for the Classification of Goods in Customs Tariffs, 1955; Brussels, Belgium, p. 38; Corrigendum No. 12, Chapter 29, Note 1(b), p. 13
- (2) Explanatory Notes, Vol. I, p. 232

b) Unsaturated Acyclic Hydrocarbons

There are four series in this category:

1. Monoethylenic hydrocarbons

- i) Gaseous members: ethylene, propylene and butylene
- ii) Liquid members: amylenes, hexylenes and octylenes

"To fall within the present heading [BTN 29.01] these unsaturated acyclic hydrocarbons must be in the form of separate, chemically defined compounds. But the heading excludes crude gaseous hydrocarbons of heading 27.11."(1)

2. Polyolefins; examples are butadiene and isoprene

3. Acetylene series

4. Ethylene-acetylene hydrocarbons; examples, vinylacetylene and methylvinylacetylene

c) Cyclanes and Cyclenes

Examples are cyclopropane, cyclopentane and cyclohexane.

d) Cycloterpenes

These products are derived from vegetable sources; examples are pinene, dipentene and camphene.

"The heading excludes essential oils (heading 33.01) and spirits of turpentine and other terpenic solvents produced by the distillation or other treatment of coniferous woods (38.07)."(2)

e) Aromatic hydrocarbons

1. Hydrocarbons with only one benzene ring: benzene, toluene and xylene.

"Benzene, toluene, xylene, etc. are classified in this heading only when they are in the form of separate chemically defined compounds in the pure or commercially pure state. Mixtures containing only xylene isomers (ortho-, meta-, para-) are also classified within the present heading. When crude the products are excluded (Chapter 27)."(3)

2. Hydrocarbons with two or more benzene rings; examples are diphenyl, diphenylmethane and triphenylmethane.

(1) Explanatory Notes, Vol. I, p. 232

(2) Same, Vol. I, p. 234

(3) Same, Vol. I, p. 234

3. Hydrocarbons with several condensed benzene rings; examples are naphthalene, nonylnaphthalene, phenanthrene and anthracene.

"Phenanthrene and anthracene fall here only when they are separate chemically defined compounds in the pure or commercially pure state. When crude, they are excluded (Chapter 27)."(1)

It seems evident from the above references that the separation between products of petroleum and petrochemicals is based on the degree of refinement, but the actual degree has to be established. This problem of the degree of purity was studied by an International Classification Committee meeting at Brussels in June, 1960. The Committee established, for the aromatics benzene, toluene and xylene of heading 29.01, the proportions of each that should distil over from a mixture of them at various ranges of temperature.

<u>Product and Distillation Characteristics</u>		<u>BTN Heading</u>
<u>Benzene</u>		
i)	the fraction of 1% to 96% by volume distils within not more than 20°C around 80.10°C	29.01
<u>Toluene</u>		
i)	the fraction of 1% to 96% by volume distils within not more than 20°C around 110.6°C	29.01
ii)	other	27.07
<u>Xylene</u>		
i)	ortho-, meta-, or para- xylene as single isomers containing not less than 95% (calculated on the weight of the anhydrous product) of the isomer in question	29.01
ii)	other	27.07

The adoption of these criteria for the aromatics of heading 29.01 would imply that a purity of about 95 per cent is perhaps correct as the point of demarcation between products of petroleum, outside the scope of the Reference, and chemicals within the study. A line of demarcation established at a somewhat lower level of purity would admit under heading 29.01 other commercial grades of the product. The characteristics set out in the above table parallel closely the specifications for "industrial grade" benzene, toluene and xylene established by the American Society for Testing Materials, (A.S.T.M.).

A.S.T.M. Distillation Standards for Benzene, Toluene and XyleneProduct and GradeDistillation Characteristics

BENZENE

Nitration grade	Total distillation within a range of 1°C around 80.1°C
Industrial grade	Total distillation within a range of 2°C around 80.1°C
Industrial-90	90 per cent recovered between the initial boiling point of 78°C and 100°C

TOLUENE

Nitration grade	Total distillation within a range of 1°C around 110.6°C
Industrial grade	Total distillation within a range of 2°C around 110.6°C

XYLENE

Nitration grade	Total distillation within a range of 3°C around 139.3°C
Industrial grade	Not more than 5 per cent recovered at 130°C and not less than 90 per cent recovered at 145°C
Five degree	Total distillation within a range of 5°C around 139.3°C
Ten degree	Total distillation between 135°C and 145°C

Source: A.S.T.M., Standards on Benzene, Toluene, Xylene, Solvent Naphtha, September, 1956, American Society for Testing and Materials, 1916 Race St., Philadelphia 3, Pa., U.S.A.

Industry Committee Classification

The Industry Committee studied the problem of classification and put its proposals before the Board during the hearing of May 23, 1961.(1) The Committee suggested standards for distinguishing between petroleum products, which are not in the Reference, and petrochemicals and, further, the allocation of products of the Reference between two headings of the B.T.N. The Committee listed its proposals under five headings which correspond as follows with the headings of the Brussels Nomenclature:

(1) Transcript, Vol. 42, p. 6180

Industry Committee

Paraffinic hydrocarbons
 Olefinic hydrocarbons
 Benzene, Toluene and Xylene
 Naphthalene
 Cycloparaffins

Brussels Nomenclature

Saturated Acyclic hydrocarbons
 Unsaturated Acyclic hydrocarbons
 Aromatic hydrocarbons
 " "
 Cyclanes and Cyclenes

While the Committee, for convenience, segregated naphthalene, it is properly classified as an aromatic hydrocarbon in the B.T.N. The BTX's were singled out from the whole series of aromatic hydrocarbons presumably because of the commercial interest in them, and because problems of purity and classification were said to be more pronounced for them than for the other aromatics.

The Industry Committee's classification provides for mixed isomers in a manner consistent with the Brussels Nomenclature, as amended by Corrigendum No. 12 (see earlier reference), except possibly where the Nomenclature specifically provides for the inclusion under heading 29.01 of the stereoisomers of acyclic hydrocarbons. The Committee made no specific recommendation for the fifth classification employed by the Brussels Nomenclature, the cycloterpenes. These are produced from vegetable sources rather than from petroleum, and were the subject of representations by companies directly concerned with them. The Committee's proposals were as follows:(1)

<u>Class and Specification</u>	<u>Proposed BTN Heading</u>
"1. <u>Paraffinic</u> A Methane, ethane, butane and propane, irrespective of purity	Note 1
B Other	
(i) When containing 95 per cent or more by weight of a single isomer	29.01
(ii) When containing less than 95 per cent by weight of a single isomer	Not in TR-120
"2. <u>Olefinic</u> A When containing 90 per cent or more by weight of a single compound or of a single isomer when more than one isomer exists	29.01
B When containing 90 per cent or more by weight of olefinic hydrocarbons, but less than 90 per cent by weight of a single compound or of a single isomer when more than one isomer exists	38.19
C When containing less than 90 per cent by weight of olefinic hydrocarbons	Not in TR-120

<u>Class and Specification</u>	<u>Proposed BTN Heading</u>
"3. <u>Benzene, Toluene and Xylene</u>	
A When containing 50 per cent or more by weight of benzene, toluene or xylene, single or mixed isomers	29.01
B When containing more than 90 per cent by weight of benzene, toluene and xylene or any two of them but less than 50 per cent by weight of any one of them	38.19
C Other	Not in TR-120
"4. <u>Naphthalene</u>	
A With a crystallizing point not below 72°C	29.01
B Other	Not in TR-120
"5. <u>Cycloparaffins</u>	
A When containing 50 per cent or more by weight of a single hydrocarbon or mixture of isomers of a single hydrocarbon	29.01
B When containing 90 per cent or more by weight of cycloparaffinic hydrocarbons, but less than 50 per cent by weight of a single hydrocarbon or mixture of isomers of a single hydrocarbon	38.19
C Other	Not in Tr-120
<p>"Note 1: These are chemicals by nature and therefore may be considered as referred to the Board by the Minister of Finance to the extent that they are now classified under T.I.No.269 but it is recommended that they be excluded from the Industry Committee's recommendations for chemicals." /Methane, regardless of purity, and the others in crude form are excluded from heading 29.01 of the B.T.N./</p>	

Appraisal of Industry Committee's Proposals

When the Industry Committee and the companies were discussing these criteria, it was emphasized that the fixing of any cut-off point as the dividing line between petrochemicals and products of petroleum involves an arbitrary decision. In fact, while there was general agreement with the principle that the percentage composition of the product is the appropriate measure, the actual percentage to be used was the subject of much discussion.

Imperial Oil Limited agreed with the Committee's recommendations for paraffins and olefins; that is, paraffins should be included in an item like BTN 29.01 as chemicals when containing 95 per cent or more by weight of a single isomer, and olefins should be included when containing 90 per cent or more by weight of a single compound or of a single isomer when more than one isomer exists. However, Imperial disagreed with the Committee's recommendation for benzene, toluene and xylene. Whereas the Committee wanted to include in an item like BTN 29.01 a product containing 50 per cent or more by weight of benzene, toluene or xylene, single or mixed isomers, Imperial Oil suggested that 90 per cent or more was a more appropriate requirement. In presenting its case, the company said:

"However, we do believe that a stream containing as little as 51% benzene ... is not commonly regarded by either the consumers or producers of benzene as really being benzene. In evidence before the Board during the week of May 8th, the Steel Company of Canada representative stated that (a) in his opinion motor grade benzol was not a chemical, and (b) that motor grade benzol contained just under 90% benzene. From a technical standpoint we believe that 90% rather than 50% represents a more logical dividing line...

"In the absence of reasons which override technical and commercial usage, we believe the criterion for aromatics ... should be 90% rather than 50% ... We believe the aromatic hydrocarbons upon which briefs have already been presented at Hearing 10 are all over 90% of a single hydrocarbon or mixture of isomers of a single hydrocarbon, in the commercial form in which they are manufactured and used in Canada."⁽¹⁾

Imperial Oil was in agreement with the Industry Committee concerning the allocation of mixtures of these chemicals to heading 38.19. However, Polymer Corporation Limited, in a letter to the Board, March 4, 1963, expressed a different view with respect to this heading, noting that hydrocarbons which do not meet quality requirements for classification under heading 29.01 are not chemicals within the scope of the Brussels definition, and that heading 38.19 should not be construed to provide for impure forms of hydrocarbon chemicals, or petroleum fractions, which are properly classified under Chapter 27. Polymer's criteria, therefore, allocate these hydrocarbons either to 29.01 or to Chapter 27, that is, either as single chemicals within the Reference or products of petroleum outside Reference 120. In advising the Board of its criteria, Polymer Corporation said:

"The distinction between 'crude' and 'separate chemically defined compounds' is bound to be arbitrary. We are prepared to concur with Imperial Oil Limited that a minimum of 90% purity would constitute the lower limit of a chemically pure compound in the case of most hydrocarbons, though we note that 95% minimum is proposed in the case of paraffins. ... we agree with Imperial Oil Limited that 90% purity rather than 50% should be used for classifying benzene, toluene and xylene as chemicals under heading 29.01."

The Brussels Nomenclature represents a classification system for the entire group of hydrocarbons, though it does not specify appropriate degrees of purity. The other systems proposed are selective; for example, they refer to benzene, toluene and xylene instead of to the whole class of aromatics, and did not deal directly with cycloterpenes which were, however, the subject of other representations before the Board. No reasons were given for suggesting a higher criterion of purity for the paraffins than for other hydrocarbons, and a single criterion of purity would have administrative advantages if it can be established. It seems probable, too, that the criterion of purity should rest on a standard of 90 per cent by weight, the more so since the important paraffins are considered not to be within the terms of

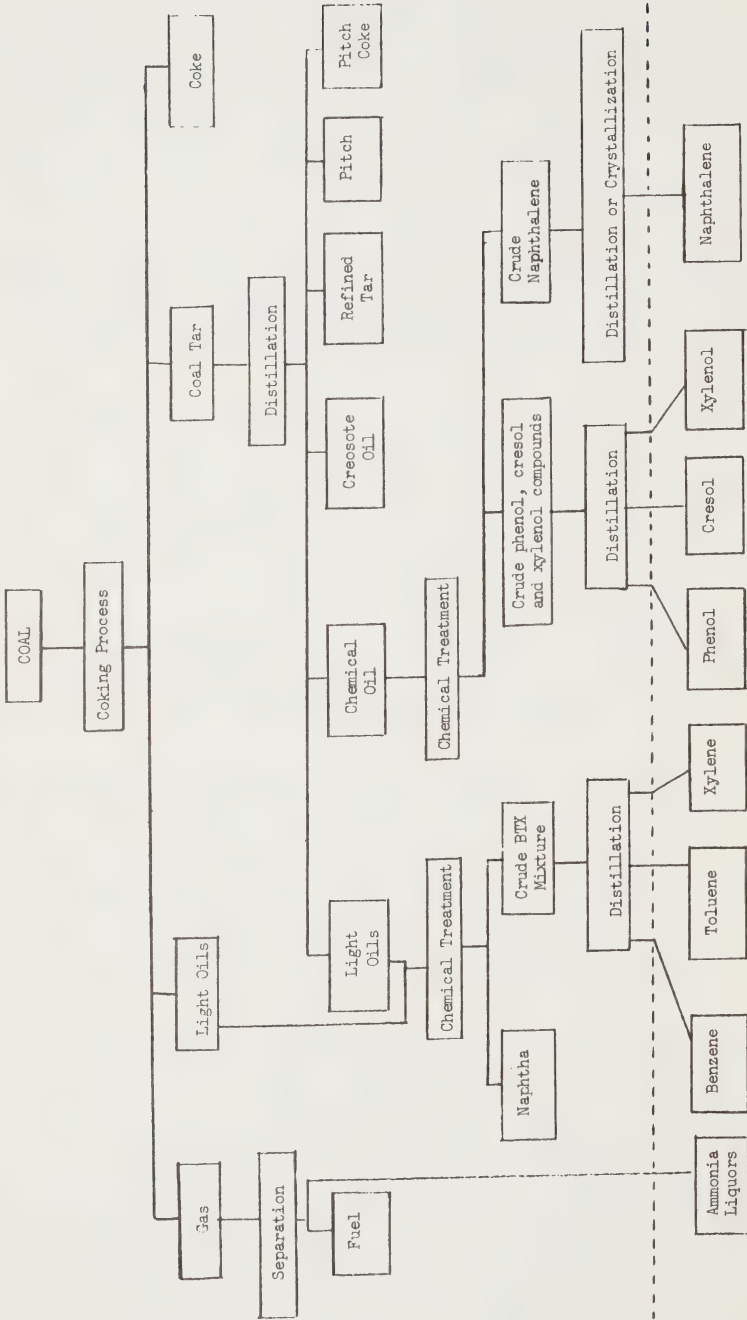
(1) Transcript, Vol. 42, p. 6189

reference, either because they have been relegated by the Brussels Nomenclature to Chapter 27, or because they are dutiable in the existing Tariff under item 275, which is not in Reference 120.

The general provision for hydrocarbons in an item like heading 29.01 of the B.T.N. would provide for these products whether derived from petroleum sources or coal and would, therefore, remove what was referred to as an anomaly in the existing Tariff, under which different rates of duty could apply to the same product depending upon its origin. The distinction would remain for crude forms dutiable under item 269 as "products of petroleum" and as unenumerated articles under item 711, if from coal.

The accompanying two charts were presented at the public hearing to illustrate, in a general way, the lines of demarcation between chemicals, on the one hand, and products of petroleum and coal which, on the other, the Industry Committee would not regard as chemicals within the terms of Reference 120.

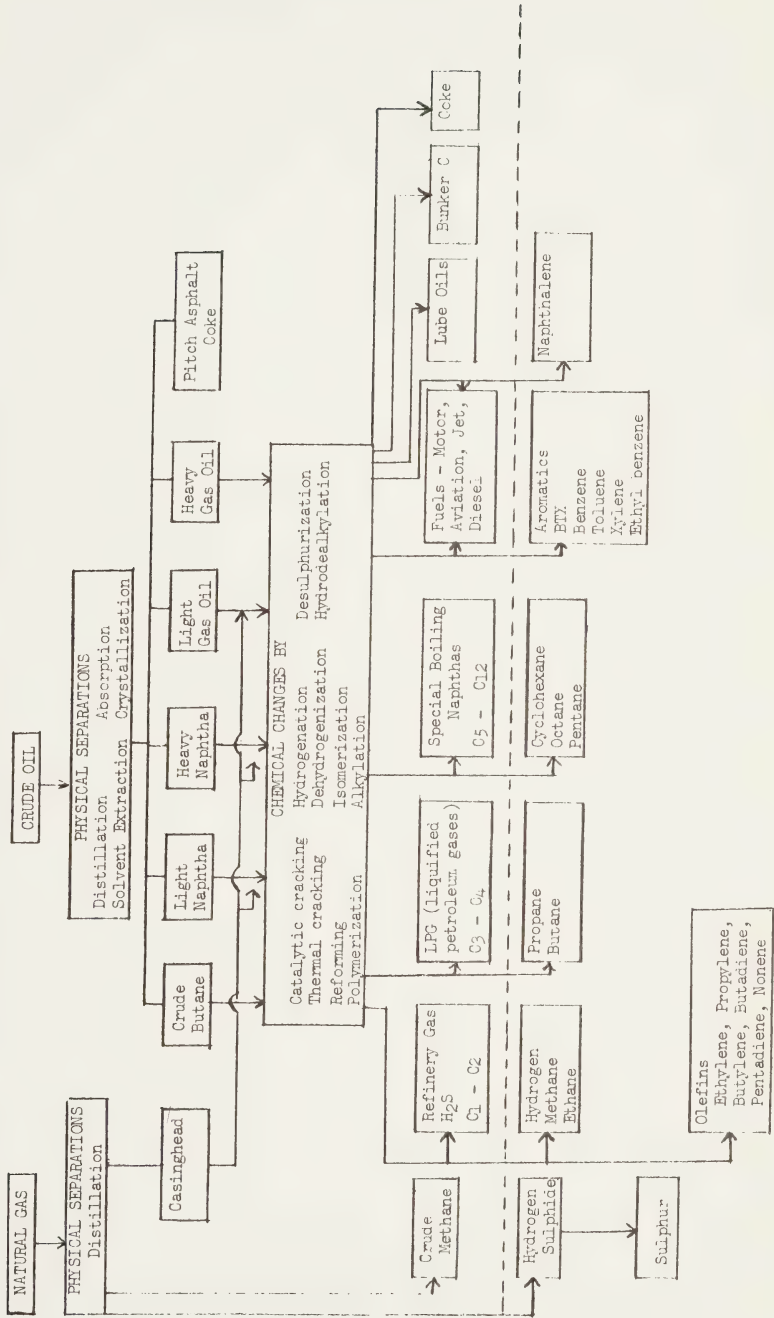
RELATIONSHIPS BETWEEN COAL, COAL PRODUCTS AND CHEMICALS



← COAL AND COAL PRODUCTS

← CHEMICALS

RELATIONSHIPS BETWEEN CHEMICALS AND NATURAL GAS, PETROLEUM AND FUELS



CA1 FN 55
-57 R 20



CANADA

Report by
THE TARIFF BOARD

Relative to the Inquiry Ordered
by the Minister of Finance
respecting

CHEMICALS

VOLUME 9

**ORGANIC CHEMICALS IN HEADINGS
15.10 and 29.14 to 29.45
OF THE BRUSSELS TARIFF NOMENCLATURE**

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by the Minister of Finance
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CHEMICALS



VOLUME 9

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OF THE BRUSSELS TARIFF NOMENCLATURE**



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J.P. Goddard

The Honourable Mitchell Sharp, P.C., M.P.
Minister of Finance
Ottawa

Dear Mr. Sharp:

I refer to Mr. Harris' letter of September 21, 1956 and to Mr. Fleming's letters of October 11, 1957 and December 21, 1959 in which the Tariff Board was requested to conduct an inquiry respecting chemicals.

In conformity with Section 6 of the Tariff Board Act, I have the honour to transmit Volume 9 of the Report of the Board, in English and in French. This volume contains the report on organic chemicals in Headings 15.10 and 29.14 to 29.45 of the Brussels Tariff Nomenclature. Further volumes will be forwarded to you as soon as they have been completed.

Yours sincerely,

Chairman

Explanation of Symbols Used

- Denotes zero or none reported
- .. Indicates that figures are not available
- * In statistical tables, indicates a reported figure which disappears on rounding, or is negligible
- (a) A small letter in brackets denotes a footnote to a table
- (1) A number in brackets denotes a footnote to the text
- s.c. Denotes a Dominion Bureau of Statistics import or export statistical class

The sum of the figures in a table may differ from the total, owing to rounding

A Note on the Organization of the Report - Reference 120

The first four volumes of the Report by the Tariff Board respecting Reference 120, Chemicals, relate to the reference as a whole; the eleven volumes which follow (Volumes 5 to 15, inclusive) relate to the products which were the subject of the Board's inquiry. The principal subject matter of each of the volumes is given below in terms of the headings of the Brussels Tariff Nomenclature (B.T.N.). Occasionally, chemicals of different B.T.N. headings are dealt with together, for example, chlorine (28.01) and caustic soda (28.17); the more detailed tables of contents of the individual volumes indicate where this occurs.

To the extent that particular statistical tables could be related to specific products or B.T.N. headings they are included in the statistical appendix of the volume which deals with that product or heading. Some tables, which could be related only to broader groupings of chemicals, are included in the statistical appendix to the last volume dealing with such broader groupings: inorganic chemicals in Volume 7, organic chemicals in Volume 9 and artificial resins and plastics in Volume 15.

Because of the unprecedented amplitude and complexity of Reference 120 - Chemicals, many parts of Volumes 5 to 15 were written a considerable time before the first four volumes. This gives rise, occasionally, to apparent discrepancies, attributable to the passage of time, particularly between Volume 4 and those which follow.

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are contained in Volume 8

* The numbers shown after product designations are those used
in the Brussels Tariff Nomenclature

MONOACIDS AND THEIR ANHYDRIDES, ACID HALIDES, ACID PEROXIDES
AND PERACIDS, AND THEIR HALOGENATED, SULPHONATED, NITRATED OR
NITROSATED DERIVATIVES -- B.T.N. 29.14

INTRODUCTION

A monoacid of this heading contains one carboxyl group, (-COOH), the characteristic group of carboxylic acids generally.

In the Explanatory Notes to the Brussels Nomenclature, this heading is divided into five sections as follows:

- (A) Saturated acyclic monoacids, including formic, acetic, propionic, butyric, valeric, palmitic, stearic, n-hexoic and n-octoic acids
- (B) Unsaturated acyclic monoacids, including acrylic acid, methacrylic acid monomer, heptyne and octyne carboxylic acids, oleic acid and linoleic acid
- (C) Aromatic saturated monoacids - benzoic acid
- (D) Aromatic unsaturated monoacids - cinnamic acid
- (E) Cyclanic, cyclenic and cycloterpenic monoacids - cyclohexanecarboxylic acid, cyclopentenylacetic acid

The B.T.N. heading excludes potable solutions of acetic acid in water containing 10 per cent or less of acetic acid. These are included with vinegar under heading 22.10.

In addition, some products of heading 29.14 bear a close relationship to the fatty acids of B.T.N. heading 15.10 which classifies mixtures of these acids, together with acid oils. These mixtures frequently occur in the saponification of fats and oils, and are generally used without being separated into the single, chemically defined products of heading 29.14. Considerable discussion took place concerning the similarities and differences between products of the two headings. This discussion is referred to in the section of the report which follows dealing with heading 15.10.

The value of shipments from Canadian plants of the chemicals of this heading, including acetic acid, in 1962 was about \$12 million and accounted for some 7 per cent of the value of shipments of all the chemicals under Chapter 29. Some of the acids of the heading, for example stearic acid, are discussed in the subsequent section of the report in conjunction with fatty acids of B.T.N. heading 15.10. Commercially, most important of the group presented under heading 29.14 is acetic acid.

ACETIC ACID

The Product and Method of Manufacture

Acetic acid (CH_3COOH) is a clear, colourless liquid with a strong vinegar-like odour, highly corrosive in the presence of air. Very soluble in water, alcohol, glycerin and ether, it is an excellent solvent for many organic compounds. At a purity of about 99.5 per cent, it is known as glacial acetic acid solidifying into colourless crystals at 16.6°C and boiling at 118.1°C . It weighs 8.64 pounds per gallon at a temperature of 20°C . Commercial acetic acid consists of solutions, in various strengths, of acetic acid in water.

Synthetic acetic acid is manufactured in Canada by bubbling air through a concentrated acetaldehyde solution under controlled conditions of temperature and pressure. The resulting 94 to 96 per cent acetic acid may be rectified to 99 per cent glacial acetic acid.

Acetic acid may be made also by the fermentation of alcohol contained, for example, in wine, beer and cider. This is an older method of manufacture but is still used in making vinegars. In another process, when hardwood is converted to charcoal in retorts in the absence of air, a pyroligneous acid liquor is produced, containing about 7 per cent acetic acid, 4 per cent crude methanol and acetone, 9 per cent tar and oils and 80 per cent water. By a process of distillation, 99 per cent pure acetic acid can be obtained. However, this process is little used today, having given way to synthetic acetic acid production.

The Industry and Market

Synthetic acetic acid is made in Canada by Canadian Chemical Company Limited at Edmonton, Alberta, and by Shawinigan Chemicals Limited, at Shawinigan, Quebec. Acetic acid as vinegar is also produced in Canada, but this is not the industrial chemical. Only acetic acid made by a fermentation process is permitted for use in food in Canada. In 1961, the fruit and vegetable canners and preservers made for sale over 10 million gallons of vinegar, with a selling value at their factories of about \$5 million. In addition, they used in their own manufacturing, about 2.6 million gallons, valued at some \$571,000. Vinegar was not the subject of any brief before the Board by producers or consumers. The Industry Committee, at the hearing of September 10, 1962, with respect to tariff item 213 under which vinegar is dutiable, stated:

"Of the goods under this item all except vinegar appear to be adequately covered by the recommendations which the Board received at the hearing on 25th September 1961, when it considered acetic acid of Heading 29.14 (O.R. V. 58 p. 8840 and on).

"In Brussels Nomenclature vinegar is classified by Heading 22.10 which is not included in the Committee's proposals. The

Committee does not consider vinegar to be a chemical and it has neither information on nor interest in the material."⁽¹⁾

Acetic acid itself is a major product of both Canadian Chemical and Shawinigan Chemicals, and is made "in tens of millions of pounds annually";⁽²⁾ imports are a very small part of total Canadian supply. The greater part of the acetic acid produced is used captively although significant quantities go into merchant sales, some 90 per cent of which occurs in Ontario and Quebec. Most of the acetic acid made by Shawinigan Chemicals is captively consumed in making vinyl acetate which, in turn, is an intermediate in the production of plastics and surface coatings. Lesser quantities are used captively in making butyl acetate and isopropyl acetate for solvents. The company sells acetic acid to two or three bulk users and many relatively small users, concentrated in Ontario and Quebec, for textile finishing and for manufacturing cellulose acetate, inorganic salts and colours.

Canadian Chemical's captive consumption is for making cellulose acetate and a range of organic acetate solvents. The company noted a substantial potential use in the manufacture of 2,4-dichlorophenoxyacetic acid (2,4-D herbicide), and suggested that, if regulations concerning food uses of this acid were "modernized", synthetic acid might replace fermentation acid for vinegar.⁽³⁾ Textile dyeing consumes much of the merchant acetic acid as a chemical intermediate and as a solvent. Merchant sales represent only a small part of this company's production. To sell in the Ontario and Quebec market the company equalizes freight charges against the Shawinigan plant at Shawinigan, Quebec. Freight from Clover Bar, Alberta to major consuming points in Ontario and Quebec was reported to be \$2.03 per hundred weight.

Imports of acetic acid under tariff items 213 and 214 are shown in the following table. Acetic acid cannot be separately identified in the data. However, the producers of acetic acid indicated that they were not concerned about imports and that such material as was imported was in dilute form, probably vinegar.⁽⁴⁾ It will be noted in the following table that the total value of imports of acetic acid and pyroligneous acid has not usually exceeded \$10,000 in recent years, though in 1963 imports exceeded \$168,000. Except for relatively small, sporadic imports from the U.K. and Western Europe, imports are from the U.S.A.

(1) Transcript, Vol. 85, p. 12925-6

(2) Same, Vol. 59, p. 8842

(3) Same, Vol. 59, p. 8872

(4) Same, Vol. 59, p. 8859, 8885

Imports of Acetic Acid,
Pyroligneous Acid and Vinegar,
1958-64

<u>Year</u>	<u>Acetic Acid & Pyroligneous Acid</u>		<u>Vinegar (any strength)</u>	
	Quantity	Value	Quantity	Value
	Gallons	\$	Gallons	\$
1958	1,093	4,760	180,980	80,895
1959	1,144	3,850	423,150	132,216
1960	933	3,163	85,740	49,455
1961	14,223	9,943	215,592	88,666
1962	4,477	5,669	167,205	92,036
1963	112,413	168,186	117,201	75,376
1964	..	..	84,653	74,087

Source: D.B.S., Trade of Canada, Imports

Export data are not available for these products, but exports are not as significant as they once were. In the early years of the Canadian industry (around 1917) exports played a prominent role. The spokesman for Shawinigan Chemicals said:

"We were at one time a major supplier to the U.K. and the U.S. industries requiring these commodities. Over the years domestic production in those countries has risen and our participation in these markets has fallen. We still have a substantial export business ... but domestic consumption, captive and otherwise, has become the dominant factor in recent years. We need both however, to operate effectively."⁽¹⁾

Until recently, the price of glacial acetic acid in Canada, in tank cars, had been 10½ cents per pound at least since 1959, with freight equalized on competing producers. Early in 1965, the price was reported to be 11½ cents per pound. In the U.S.A. the price of glacial acetic acid, in tank cars, has been published at 10 cents per pound, on a delivered basis. The delivered price to Canadian consumers is, therefore, apparently higher than that to consumers in the U.S.A.

⁽¹⁾ Transcript, Vol. 59, p. 8844

Tariff Considerations

Acetic acid is specifically provided for in two tariff items:

	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
213		
Acid, acetic and pyroligneous, n.o.p., and vinegar:-per gallon of any strength not exceeding the strength of proof.....	10 cts.	12 $\frac{1}{2}$ cts.
and in addition thereto, for each degree of strength in excess of the strength of proof.....	1 $\frac{1}{2}$ cts.	1 $\frac{3}{4}$ cts.
The strength of proof shall be held to be equal to six per cent of absolute acid, and shall be determined in the manner prescribed by the Governor-in-Council.		
Ex. GATT		
Vinegar:-per gallon of any strength not exceeding the strength of proof.....		10 cts.
and in addition thereto, for each degree of strength in excess of the strength of proof		1 $\frac{1}{2}$ cts.
The strength of proof shall be held to be equal to six per cent of absolute acid, and shall be determined in the manner prescribed by the Governor-in- Council.		
214		
Acid, acetic, crude and pyroligneous crude, of any strength not exceeding thirty per cent...	15 p.c.	22 $\frac{1}{2}$ p.c.

It may also be entered duty-free under various end-use items, for example item 791 as a material for use in the manufacture of disinfectants and pesticides, and item 851 when for use in the manufacture of synthetic rubber.

Representations concerning acetic acid were made before the Board by the two producers, Canadian Chemical Company, Limited and Shawinigan Chemicals Limited, and also by Naugatuck Chemicals Division of Dominion Rubber Limited and by Polymer Corporation Limited.

Shawinigan Chemicals noted that, while the present tariff has enabled domestic producers to secure almost the entire Canadian market, the company feels that the rates are prohibitive and could be reduced to 15 p.c., B.P. and 20 p.c., M.F.N. without harm to the industry. The existing rates might amount to 160 to 168 per cent on an ad valorem basis for pure acetic acid. The company recommended, in addition, that items 213 and 214 be deleted.

Naugatuck Chemicals and Canadian Chemical agreed that rates of 15 p.c., B.P. and 20 p.c., M.F.N. should be applied, with the qualification by Naugatuck that the rates which it proposed for its products should also be accepted.⁽¹⁾ Polymer wanted duty-free entry for acetic acid to be continued for use in the manufacture of synthetic rubber.

The two producers were in agreement that the wording of items 213 and 214 and the method of establishing the rate of duty are archaic and difficult to apply. The difficulty centres around the concept of expressing the proportion of acid by reference to "strength of proof". In addition, the chief distinction in scope between item 213 and item 214 is that item 214 specifies "crude" acid, a product which does not occur in the synthetic process.

The principal considerations that came before the Board concerning acetic acid and vinegar were with respect to classification and the proposed changes in wording and classification. One feature of the difference between the existing tariff items and the proposed is the reference in existing items to strength of proof of the acid.

In practice, to determine the strength of proof, samples of stipulated size are taken from a shipment and neutralized with a base (sodium hydroxide) whose strength, or normality, is known and designated as unity. The volume, in cubic centimeters, of sodium hydroxide required to neutralize the acid is multiplied by a factor of 0.51, to obtain the percentage of acid (strength of proof) for duty purposes. The effect of this calculation is to reduce the acid content of the sample to its acetic anhydride equivalent. Acetic anhydride is the "absolute acid" referred to in item 213, and is the reference acid in determining the strength of the sample. This method assesses the strength of a sample against acetic anhydride. The present consensus of opinion is that the standard should be pure acetic acid. If the strength of a sample were measured against the pure acetic acid equivalent, a factor of 0.6 would be substituted for the factor 0.51. By the proposal for ad valorem rates no factor would need to be used.

Strong acetic acid can be diluted readily and dilute acetic acid can be strengthened by a simple process; the strength of the acid

(1) Transcript, Vol. 59, p. 8878

for shipment to Canada, therefore, can be readily varied to take advantage of the lowest rate of duty, having in mind transportation costs and other considerations.

The crude pyroligneous acid enumerated in item 214 seems to be more truly a pyroligneous liquor from which various products, among them acetic acid, may be obtained; it is not a significant product in terms of Canada's international trade.

The proposals before the Board were that acetic acid should be classified under an item like heading 29.14 of the B.T.N. This would provide for the separate, chemically defined product regardless of the amount of water present. Crude pyroligneous acid is also classified under B.T.N. 29.14 where it is referred to as "a crude acetic acid obtained from dry distillation of wood, and contains about 50% of acetic acid".(1) This interpretation might leave some crude pyroligneous to be classified elsewhere in the Customs Tariff.

The Brussels Nomenclature does not classify vinegar as a separate chemical, but includes it in a chapter on "Beverages, Spirits and Vinegar". Dilute acetic acid is called a "substitute for vinegar", to which caramel or other colouring or flavouring matter is often added; similarly, vinegars made from wine, beer, cider, spirits and so on may be flavoured and may contain added spices. If tariff items 213 and 214 were deleted from the Customs Tariff some other provision for vinegar would be necessary; no proposals were received by the Board as to what this provision should be.

ACETIC ANHYDRIDE

Acetic anhydride is a dehydrated super-concentrated form of acetic acid, made in Canada by the same companies that make acetic acid, Canadian Chemical Company Limited, Edmonton, Alberta, and Shawinigan Chemicals Limited, Shawinigan, Quebec. It can be used in most chemical reactions where acetic acid is used, and the choice depends upon weighing possible greater ease of production against increased cost. Shawinigan Chemicals said, "Almost all of our acetic anhydride is used in conjunction with acetic acid to make cellulose acetate. It finds relatively minor use in Canada in the production of certain fine chemicals".(2) Shawinigan's sales for the manufacture of cellulose acetate were said to be made to Canadian Celanese Limited, but the company claimed also to have a substantial export business.

The other producer, Canadian Chemical Company, "has a large captive use for acetic anhydride in the manufacture of cellulose acetate. The only merchant sales of any magnitude by Canadian Chemical Company are to another producer of cellulose acetate".(3) This other producer is Canadian Celanese Limited, a company with which the Canadian Chemical Company became integrated in July, 1963, as Chemcell (1963) Limited.

(1) Explanatory Notes, Vol. 1, p. 258

(2) Transcript, Vol. 59, p. 8843

(3) Same, Vol. 59, p. 8890

The Canadian price in tank car quantities, at works, was reported to have been $14\frac{1}{2}$ cents per pound, at least since January 1959. In the U.S.A. the published price is 14 cents per pound in tank car lots, delivered.

Imports, which were said to be small, can be entered under tariff item 213. The rate, per gallon of any strength not exceeding the strength of proof, is 10 cents, B.P. and $12\frac{1}{2}$ cents, M.F.N., and in addition thereto, for each degree of strength in excess of the strength of proof, $1\frac{1}{2}$ cents, B.P. and $1\frac{3}{4}$ cents, M.F.N. These rates were said to be equivalent to from 125 to 136 per cent on an ad valorem basis. The tariff considerations and representations for acetic anhydride are essentially the same as those presented above for acetic acid, except that there is no crude form of the anhydride. The anhydride is classified in the B.T.N. by heading 29.14.

VINYL ACETATE

Vinyl acetate is made in Canada only by Shawinigan Chemicals Limited at Varennes, Quebec. It is made by reacting acetic acid with acetylene, and its manufacture is the major use for Shawinigan's acetic acid. The capacity of the plant, according to trade information, is 60 million pounds per year; about 25 million pounds of the company's production was said to be for export to a formerly affiliated company in the United States.⁽¹⁾ It is also exported to Commonwealth countries and to South America. Exports are an essential element in the economic manufacture of vinyl acetate; the Canadian market is not big enough to provide the economies of large-scale production.⁽²⁾ There were said to be no imports of the monomer, though there are imports of polyvinyl acetate and products made from it. Published data show imports of vinyl acetate of \$355,000 in 1962 and \$245,000 in 1963; these may be the polyvinyl acetate resin of B.T.N. heading 39.02.

As one of the vinyl family of chemicals, vinyl acetate can be polymerized to form synthetic resins such as polyvinyl acetate resins and copolymers. These provide its sole commercial use. The Canadian published price in tank car lots at works was 16 cents per pound in January, 1959; early in 1962, it was 15 cents and by mid-1964, 14.4 cents per pound and in 1965, it was 14 cents per pound. In the U.S.A., the 1959 published price in tank car lots, delivered, was 17.5 cents per pound; in March, 1965, the U.S. price was $11\frac{1}{2}$ cents per pound.

Vinyl acetate may be imported under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. Shawinigan Chemicals Limited requested that the rates of duty applicable to this chemical remain at the current level because, as the major use for the company's acetic acid, it is an integral part of Shawinigan's operation. No reasons were advanced as to why these rates, in particular, were appropriate for the product.

(1) Oil, Paint and Drug Reporter, June 1, 1964, p.5

(2) Transcript, Vol. 59, p. 8903

Speaking more generally, B.F. Goodrich Canada Limited stated:

"It is our belief that the basic raw materials, vinyl chloride (29.02) and vinyl acetate (29.14) monomers, which normally account for 60 per cent of selling prices or resins, should not require tariff protection in excess of the finished product (polyvinyl chloride resins) for which they are primarily produced."⁽¹⁾

CALCIUM FORMATE, FORMIC ACID, SODIUM ACETATE AND SODIUM FORMATE

At the time of the hearing, these chemicals, except for formic acid, were imported under tariff item 208t at rates of Free, B.P., 15 p.c., M.F.N. Sodium acetate has since been ruled made in Canada, and is dutiable under tariff item 711 at 15 p.c., B.P., 20 p.c., M.F.N. Formic acid is named in an extract of item 216, free of duty under the B.P. Tariff and at 12½ p.c., M.F.N. Formic acid when imported for use in the manufacture of a fumigant or insecticide may be entered duty-free under item 791. Imports of formic acid in 1964 were reported to be nearly 1.8 million pounds, valued at \$176,000.

The Tanners Association of Canada submitted a proposal on the above four chemicals which are used in tanning leather for footwear. The Tanners Association recommended that they should be imported free of duty under both Tariffs "in the best interests of the tanning industry and of the Canadian economy as a whole".⁽²⁾ The value of imports was said to be small.

Imperial Chemical Industries, as exporters to Canada, submitted a proposal on calcium formate. The company said that its product is used by the leather tanning industry, principally in Ontario and Quebec, and that Canadian consumption "is believed to be of the order of several hundreds of thousands of pounds annually and I.C.I. believes it may supply a quarter of this".⁽³⁾ It was later suggested that the market in Canada might be for 500,000 pounds; at the indicated price of \$4 to \$6 a hundredweight, this quantity would have a value in the order of \$25,000. Imperial Chemical Industries requested that the rates under item 208t should remain unchanged except that, if and when calcium formate is made in Canada in quantity substantial in relation to Canadian demand, rates of 15 p.c., B.P. and 20 p.c., M.F.N., should apply. Further, if supplies in future should not be available from British or other Commonwealth sources, I.C.I. would not object to duty-free entry from all sources.

A further proposal on sodium acetate was made by the Primary Textiles Institute whose members use it in dyeing fabrics. The Institute supported the proposal of free entry for sodium acetate.

(1) Transcript, Vol. 153, p. 22779

(2) Same, Vol. 59, p. 8825

(3) Same, Vol. 59, p. 8827

LEAD FORMATE

Lead formate is made in Canada by McArthur, Irwin Limited. There are no known imports and only one known consumer in Canada. At the time of the hearing in September, 1961, lead formate was dutiable under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. It has since been ruled made-in-Canada and is dutiable under item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N., the rates which the manufacturer proposed should apply.

OTHER CHEMICALS OF HEADING 29.14

A great many other products that would be classified by B.T.N. heading 29.14 were brought to the attention of the Board. A number of these are made in Canada, usually as a fairly minor part of a company's operation. Many others are imported for direct sale for specialty uses, or for further processing. Generally speaking, very little commercial information is available concerning the products which, individually, are likely to be of minor commercial importance.

For those products that are made in Canada, the producers generally favoured the uniform application of rates of 15 p.c., B.P., 20 p.c., M.F.N., and the users, at times, were prepared to agree to that level of protection. For the products not made in Canada, the importers and consumers favoured free entry or the maintenance of existing British preferential margins.

Shawinigan Chemicals Limited submitted a proposal on saturated acetate esters, a class of chemicals of which three are made by the company: ethyl acetate, isopropyl acetate and butyl acetate. It also submitted data on two which the company does not make, amyl acetate and methyl amyl acetate. These are used as solvents in making lacquer and are combined with alcohols and aromatic naphthas for this purpose. Imports of ethyl acetate in 1963 were valued at \$115,000.

The company said that the choice of a solvent mix is governed by solvent power, evaporation rate and price. In this connection the brief noted:

"The saturated acetate esters almost invariably end up in mixtures and, therefore, need not even be pure chemicals to start with. Some saturated acetate ester manufacturers find it convenient to make them by reacting a mixture of several alcohols that may occur as a mixture in their processes with acetic acid. Others such as ourselves, by the nature of their raw material sources, find it more convenient to make single esters and sell them to the trade as such or as a subsequent mixture of the esters after manufacture".⁽¹⁾

Exports were said to be of little consequence and imports to supply less than one half of one per cent of Canadian requirements. Millions of pounds are used annually, and Canadian capacity was said to be ample to meet the demand; all production was for sale.

(1) Transcript, Vol. 59, p. 8926

Currently, ethyl acetate, butyl acetate and methyl amyl acetate may be entered under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N.; isopropyl acetate may be entered as a named chemical under item 208v at rates of Free, B.P. and 25 p.c., M.F.N.; amyl acetate comes under item Ex. 166 at rates of 10 p.c., B.P. and 25 p.c., M.F.N. Amyl acetate and methyl amyl acetate are named in tariff item 875a, free under both Tariffs, when for use in the manufacture of antibiotics. Canadian Chemical Company Limited expressed the opinion that all imports of these chemicals would be for this use.

With respect to amyl acetate, W.J. Bush and Company (Canada) Limited which supplies chemicals from their parent company in the U.K. noted:

"Unless for use in the manufacture of antibiotics, this chemical is at present classified under tariff item 166. The historical reasons for classifying amyl acetate in the section of the tariff reserved for wines and spirits is no longer valid and we respectfully submit that if it is recognized that amyl acetate is properly classified as an organic chemical in chapter 29.14, then it should be treated as such for duty purposes in accordance with our recommendations above."⁽¹⁾

W.J. Bush and Company requested rates of Free, B.P. and 15 p.c., M.F.N. until it is made in Canada, at which time it should be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N.

Shawinigan Chemicals Limited requested that all saturated acetate esters of heading 29.14 be dutiable at rates of 15 p.c., B.P., 20 p.c., M.F.N. Shawinigan Chemicals particularly objected to W.J. Bush's requested rates of duty on the grounds that only minor quantities of the chemicals are imported for the uses of interest to W.J. Bush, and to permit lower rates of duty would be to jeopardize Canadian manufacture for the much larger use in lacquer solvents.⁽²⁾

Canadian Chemical Company Limited submitted a brief on acetates, of which the company makes n-butyl acetate, methyl amyl acetate, n-propyl acetate and several mixed acetates. These acetates are made in a batch process, using the same equipment for all and, "It is, therefore, not possible to provide a meaningful figure of capacity to produce each acetate".⁽³⁾ The company said that it offers the trade a variety of mixed acetates and that sales of these mixtures substantially exceed the sales of the individual acetates. They are used as solvents in the formulation of protective coatings. Canadian Chemical Company uses none of these acetates captively. Although mixed acetates are important to the company, it also makes and sells the individual, pure acetates; Canadian Chemical was said to be the only Canadian manufacturer of n-propyl acetate and methyl amyl acetate, but is one of the two producers of n-butyl acetate, the other being Shawinigan Chemicals Limited. The market for these acetates is

(1) Transcript, Vol. 59, p. 8986

(2) Same, Vol. 59, p. 8974

(3) Same, Vol. 59, p. 8948

concentrated in Ontario and Quebec. The U.S. prices of methyl amyl acetate and of n-butyl acetate were $14\frac{1}{2}$ cents per pound until mid-1964 when they dropped to $13\frac{1}{2}$ cents a pound. The U.S. price of n-propyl acetate was $11\frac{1}{2}$ cents per pound in 1964 and 11 to 12 cents per pound in 1965. Canadian Chemical sells the acetates on a delivered basis.

The acetates dealt with in this presentation are, like those in the Shawinigan Chemicals' brief, dutiable under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. The application of item 875a to methyl amyl acetate has been noted above. Mixed acetates would typically be classified in the B.T.N. under heading 38.18 which provides for composite solvents. Of these, Canadian Chemical Company said "the rate on any mixture should bear the rate equivalent to the highest rate of the chemicals in the mixture, otherwise it will simply be used to avoid the rates set out".(1)

Fine Chemicals of Canada Limited proposed that end-use items 875a and 880p be combined and the wording and sense enlarged to eliminate the restriction to use in the manufacture of specific antibiotics. The combined item would allow the duty-free entry of any chemical reagent or raw material, not made in Canada, used in the manufacture of an antibiotic for human or animal medicine. This proposal applies particularly to methyl dichloroacetate, under heading 29.14; it is not made in Canada but is imported by the company for use in making chloramphenicol, an antibiotic.(2)

Canadian Chemical Company manufactures isobutyl acetate but expressed the intention to eliminate its production gradually. It is dutiable under item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N.; as for other acetates, the company wishes to have these rates retained.

The Canadian Pulp and Paper Association submitted a proposal on lead acetate and stearic acid. In discussing its approval of the attempt to revise the Canadian Tariff, the Association said "we must strongly oppose any revision which would result in an increase over current tariff rates, either now or in the future, in respect of chemicals used by the pulp and paper industry".(3) The Association noted that these two chemicals were used by the industry, but made no further observations concerning them.

Polymer Corporation Limited expressed an interest in aluminum stearate, zinc stearate, oleic acid and stearic acid, saying that they "consider it essential that the tariff provisions in respect of materials for use in the manufacture of synthetic rubber, now contained in item 851, be continued".(4) These chemicals are currently free of duty under tariff item 851 for use in making synthetic rubber, and Polymer Corporation wishes to see these rates continued. Aluminum and zinc stearates are further discussed below.

The interest of W.J. Bush and Company (Canada) Limited in amyl acetate has been discussed above. In addition to this chemical,

(1) Transcript, Vol. 59, p. 8946

(2) Same, Vol. 79, p. 12112

(3) Same, Vol. 59, p. 8901

(4) Same, Vol. 59, p. 8895

this company and its U.K. affiliate listed a large number of chemicals of heading 29.14 in which they are interested as importers and producers, respectively. The list is appended to the end of this part of the report. A number of the chemicals are used in the manufacture of flavours and perfumery compounds. The Canadian company both uses them and sells them to others. None of the chemicals is made in Canada.

The company said that, although they "have been able to trade occasional imports under tariff item 264a", as essential oils at rates of Free, B.P. and $7\frac{1}{2}$ p.c., M.F.N., these chemicals are imported most regularly under tariff item 208t, at rates of Free, B.P. and 15 p.c., M.F.N. The company requested the continuation of these rates until the products are made in Canada, at which time rates of 15 p.c., B.P. and 20 p.c., M.F.N. should apply.

With respect to chloroacetic acid, tetra stearyl titanate, n-toluic acid and zinc stearate, Naugatuck Chemicals, as a consumer of these chemicals, submitted a statement saying:

"We take no issue with the rates which are being proposed to you by the producers of these materials, provided the Board also recommends those rates which will be proposed to you for the products which we manufacture."(1)

In 1964, there were imports of nearly 4 million pounds of monochloroacetic acid, valued at \$509,000 an average value of 13 cents per pound. These were from West Germany and France.

Imports of zinc stearate (see below) are dutiable under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. The two acids are dutiable under tariff item 216 and tetra stearyl titanate under item 208t, at rates of Free, B.P. and 15 p.c., M.F.N. No change from these rates was recommended by any other party.

Similarly, continuation of rates currently in effect was recommended by Charles E. Frosst and Company for dichloroacetyl chloride. This chemical is used in manufacturing a costly medical research drug and the company said that, "A change in duty rate would increase the cost of an end product which already is a high cost drug".(2) Dichloroacetyl chloride is currently dutiable under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. The Industry Committee said that it had no objection to the company's proposal if the data presented "shows that it is significant enough to receive a separate item".

Minnesota Mining and Manufacturing of Canada Limited made a proposal on the following chemicals:

trifluoro acetic acid
perfluoro propionic acid
perfluoro butyric acid

perfluoro octanoic acid
ammonium perfluoro caprylate
an alkali metal salt of a
perfluoro alkyl mono-
carboxylic acid

(1) Transcript, Vol. 60, p. 8892

(2) Same, Vol. 60, p. 8893

The company noted that the market for fluorochemicals in general is relatively new and, therefore, small but that they will likely have important future uses. These products are understood to have applications based on their strong acidic properties and surface activity, and are used in waxes, polishes and cleaning preparations. In recommending duty-free entry under both B.P. and M.F.N. Tariffs, until made in Canada, the spokesman for the company said:

"The intent of our broad meaning... was that we hoped certain ground rules or principles would be laid down for the consideration of these chemicals which, perhaps, are yet to be born - that they could be considered in due course."⁽¹⁾

When made in Canada, the products would, by the company's proposal, be dutiable at 15 p.c., B.P., 20 p.c., M.F.N. Currently these chemicals may be entered into Canada under tariff item 208t or 216 at rates of Free, B.P. and 15 p.c., M.F.N.

Witco Chemical Company of Canada Limited agreed with the proposal for free entry under both B.P. and M.F.N. Tariffs recorded by the Industry Committee for propionic acid, and for rates of 15 p.c., B.P. and 20 p.c., M.F.N. for calcium propionate and sodium propionate.

Propionic acid may be imported free of duty under tariff item 791, when for use in the manufacture of pesticides. The propionic acid is used by Witco Chemical for making propionates. Imports, in 1963, were valued at \$95,000. The published U.S. price for propionic acid in tank cars, delivered, has recently been 14.75 cents per pound.

Calcium and sodium propionate are used to inhibit the growth of mould and rope in food such as cheese and bakery products. When so used they may be imported free of duty under item 791 or 219a(ii), under both the B.P. and M.F.N. Tariffs. Duty-free entry is likely to apply to a substantial part of imports; the general provision, however, is that of item 711 for unenumerated goods at rates of 15 p.c., B.P. and 20 p.c., M.F.N. The latter are the rates proposed by the company. Import data are incomplete, but it would appear that imports might supply as much as two thirds of the consumption of the two propionates, which together were estimated to amount to about one million pounds.⁽²⁾ Available information indicates that the annual value of imports of sodium propionate has been in the order of \$60,000 to \$70,000 in recent years; the published price of both propionates in the U.S.A. is about 23½ cents per pound, suggesting the importation of approximately 250,000 to 300,000 pounds per year.

The term acrylic monomers was applied by the Canadian Paint Varnish and Lacquer Association to a group of eleven chemicals which are the monomeric esters of acrylic acid and methacrylic acid. The chemicals are listed on the following page.

⁽¹⁾ Transcript, Vol. 60, p. 8899

⁽²⁾ Same, Vol. 60, p. 8912

The acrylic monomers themselves are currently used in small quantities by the paint industry for high quality baking enamels. Consumption in 1961 was estimated at about 70,000 pounds valued at \$28,000 to \$30,000.⁽¹⁾ Prices of the monomers were said to range from 30 to 60 cents a pound. Larger quantities are used by the paint manufacturers as purchased acrylic emulsions, which are dispersions of polymerized monomeric esters, often mixtures with a solids content of about 46 per cent. In 1961 the value of acrylic monomers contained in the emulsions was estimated to be about \$1 million. The use of acrylic emulsions was said to be growing rapidly and was expected to reach 10 million pounds by 1965, compared with an estimated 3 million pounds in 1960.

None of the acrylic monomers mentioned by the Association is produced in Canada. They are imported from the United States, currently under tariff item 921, free of duty as materials, not made in Canada, for use in the manufacture of synthetic resins. In 1963, imports of ethyl acrylate were reported to be valued at more than one million dollars, of methyl acrylate at \$165,000 and of 2-ethylene acrylate at \$100,000.

The Association noted that a duty on these products would not benefit the chemical industry in Canada, but would increase the cost of chemicals, to the ultimate detriment of the consumer. Its proposal, therefore, was for continued free entry "until such time as all of those of major importance become made in Canada."⁽²⁾ The emulsions are made in Canada by Rohm and Haas Company of Canada Limited, Reichhold Chemicals (Canada) Limited and The Borden Chemical Company (Canada) Limited. Rohm and Haas, in supporting the submission of the CPVLA, referred to itself as "Canada's largest consumer of acrylic monomers."

The chemicals are as follows:

Acrylic acid and its esters:

Methyl acrylate
Ethyl acrylate
Butyl acrylate
2-Ethylhexyl acrylate

Methacrylic acid and its esters:

Methyl methacrylate
Ethyl methacrylate
Butyl methacrylate
Hexyl methacrylate
Decyl-octyl methacrylate
Lauryl methacrylate
Stearyl methacrylate

The monomers are used in other products as well, for example in plastics, leather, textiles and paper. They were said to have unique properties for acrylic type coatings, binders and waxes, and their consumption was expected to increase rapidly. Imports of methyl methacrylate, in 1963, were valued at \$470,000.

Dow Chemical of Canada expressed an interest in the rates of duty on these acrylic monomers because of its production of styrene-butadiene latices which are also used for emulsion paints and surface coatings. The company suggested that the rates of duty on the two

⁽¹⁾ Transcript, Vol. 60, p. 8919

⁽²⁾ Same, Vol. 60, p. 8921

groups of products should be considered together; the company made a submission on the latices under heading 39.02, at which time it proposed rates of 15 p.c., B.P., 20 p.c., M.F.N., with a minimum rate of 5 cents a pound. The three emulsion producers referred to above, together with Polysresins Limited proposed rates of 15 p.c., B.P., 20 p.c., M.F.N. for acrylic emulsions under the same heading.

W.J. Bush and Company (Canada) Limited submitted a proposal for sodium benzoate and benzoic acid. Sodium benzoate is made in Canada by W.J. Bush. The company spokesman said that is prepared to increase the capacity of its plant to meet demand as it arises. Sodium benzoate is used as a preservative in food and as a corrosion inhibitor in anti-freeze solutions. It may be imported under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N., and the company requested that these rates of duty be continued.

Benzoic acid, at the time of the hearing in September, 1961, was not made in Canada but was imported by W.J. Bush from its parent company in England. It was imported under tariff item 216 at rates of Free, B.P. and 15 p.c., M.F.N. A technical grade is used to make the sodium benzoate mentioned above, and it is this grade that was imported. In 1964, 22,800 pounds of benzoic acid were imported, valued at approximately \$8,000, an average value of about 36 cents per pound; these imports were from the United Kingdom. The company requested that these rates be continued until benzoic acid was made in Canada, at which time it proposed rates of 15 p.c., B.P. and 20 p.c., M.F.N. Since the hearing, benzoic acid technical grade has been ruled made in Canada and is now dutiable under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N.

John Wyeth and Brother (Canada) Limited submitted a proposal on benzoic acid and zinc propionate neither of which, it said, was made in Canada, and for which the company recommended that the rates currently in effect, Free, B.P., and 15 p.c., M.F.N., should be continued "until such time as a substantial portion of Canadian requirements is available from Canadian production".⁽¹⁾

Dow Chemical of Canada Limited noted that the company could produce benzoic acid in the process of making phenol from toluene at Ladner, B.C., and that at the time of the hearing company officers were "reviewing the situation to determine whether they should offer benzoic acid on the Canadian market". Imports, the spokesman said, were in the order of 800,000 pounds, valued at about \$160,000, in 1960; imports in 1964, as noted above, were reported to be 22,000 pounds valued at just over \$8,000. The company did not object to benzoic acid being at rates of Free, B.P. and 15 p.c., M.F.N. until made in Canada; as noted above, the product is now so ruled.

Benzoyl chloride was brought to the attention of the Board by Wallace and Tiernan Limited. Not made in Canada, this chemical is used in the production of benzoyl peroxide which, in turn, is used as a catalyst or in bleaching flour. The company said that in 1960 it imported 190,160 pounds of benzoyl chloride from the United States

(1) Transcript, Vol. 60, p. 8940

under tariff item 208t and, hence, paid duty at the rate of 15 per cent under the M.F.N. Tariff. The company recommended duty free entry of benzoyl chloride into Canada because it is not made in Canada.

Nuodex Products of Canada Limited made a proposal with respect to 2-ethyl hexoic acid, which is used in the manufacture of metallic soaps used as driers in paints and by the plastics and floor covering industries. It is not made in Canada, and, while there are other materials used as driers, this product has particular odour-free characteristics which make it preferred in special applications. Imports in 1963 were valued at \$60,000. At present 2-ethyl hexoic acid is dutiable under tariff item 216 at rates of Free, B.P. and 15 p.c., M.F.N. The company recommended free entry under all Tariffs "until such time as 2-ethyl hexoic acid or a product with similar properties is produced in Canada".⁽¹⁾ When it is made in Canada, the applicable duty is "immaterial so long as we can purchase it in Canada".⁽²⁾

A joint brief was submitted to the Board by Lever Brothers Limited and the Procter and Gamble Company of Canada Limited on lauric acid and methyl laurate, both products when not less than 90 per cent pure. The reason for including the criterion of purity was apparently to assure the differentiation between the chemically distinct material of B.T.N. heading 29.14 and the mixtures of fatty acids of B.T.N. heading 15.10. Lauric acid is distilled from coconut fatty acid, itself derived from coconut oil.

The companies said that the lauric acid of interest to them is usually 90 to 96 per cent pure. They noted further that there are several gradations of products: "The most common form of it is the coconut fatty acid which is 48% Cl2. The next category might be called middle-cut coconut fatty acid which is 65 to 67% Cl2; and then, to take the large portion, it is 90% or greater Cl2".⁽³⁾ It was evident that the only lauric acid of use to the companies is that which is at least 90 per cent pure and that their intention was to express no interest under this heading in any other. "We believe it would be logical to classify lauric acid, not less than 90% pure, under B.T.N. 29.14, and lauric acids of lower purity under B.T.N. 15.10".⁽⁴⁾

Lauric acid of the higher purity is not made in Canada, and the major source of imports was said to be Denmark, although it is also made in Germany, the U.K. and the U.S.A. Imports in 1963 were valued at \$175,000. In 1964 there were 778,500 pounds of lauric acid imported, with a value of more than \$217,000. In that year, the United Kingdom supplied more than 247,000 pounds of this total; West Germany, Denmark, the Netherlands and the U.S.A., in almost equal proportions, supplied the remainder. During recent years the price has ranged from \$2 to \$2.80 per pound. However, the imports in 1964 had a very much lower average value, suggesting a product of much lower purity. Its principal use is as a foam stabilizer for light duty detergents and liquid cleaners.

(1) Transcript, Vol. 60, p. 8945

(2) Same, Vol. 60, p. 8950

(3) Same, Vol. 60, p. 8961

(4) Same, Vol. 60, p. 8951

Methyl laurate was said to be a direct substitute for lauric acid in many cases and the companies expressed the opinion that the two should carry the same rate of duty.

Lever Brothers and Procter and Gamble proposed that lauric acid, not less than 90 per cent pure, and methyl laurate, not less than 90 per cent pure, should be accorded rates of Free, B.P. and 10 p.c., M.F.N. The spokesman said, with reference to the reduction of the British preferential margin from 15 to 10 percentage points, "We feel that this is a substantial enough margin".⁽¹⁾ The companies made no recommendation for methyl laurate of other degrees of purity, but proposed that "lauric acid of less than 90% purity should receive the full basket rates -- 15 and 20%".⁽²⁾ The companies make low purity material, and were parties to a submission on mixed fatty acids under heading 15.10 which is dealt with below.

A proposal for zinc laurate was placed before the Board by Naugatuck Chemicals Division of Dominion Rubber Company Limited. While the pure chemical is likely not made or used in Canada, it is of interest to Naugatuck because it would be directly competitive with a product made by the company, known by the trade designation "Laurex"; this product is apparently mistakenly called zinc laurate although it is more properly the zinc salts of a mixture of fatty acids in which lauric acid predominates. The product as made in Canada by Naugatuck Chemicals, therefore, is not properly classified as a single chemically defined substance under heading 29.14, but as a mixture of heading 38.19. Zinc laurate, however, is properly classified in heading 29.14. It, and the Laurex with which it is confused, are used in the manufacture of rubber as accelerator activators and plasticizers; they are directly competitive and are also competitive with stearic acid and zinc oxide. Naugatuck Chemicals recommended that the rates of duty currently in effect under tariff item 711, 15 p.c., B.P. and 20 p.c., M.F.N., should be continued for both Laurex and zinc laurate.

Nopco Chemical Canada Limited submitted a general statement to the Board "to record our support of the position of the Industry Committee who are requesting tariff treatment under this heading at 15 per cent, B.P. and 20 per cent, M.F.N.". The company said it has capacity at London, Ontario, to manufacture esters which, for the most part, are used captively. The chemicals in which the company expressed an interest are listed below. One of these is butyl stearate which was mentioned by the Rubber Association of Canada as a chemical used in fairly substantial quantity as a plasticizer in the production of synthetic resin film. For this use it was formerly entered into Canada free of duty under tariff item 921 as a chemical of a kind not made in Canada, for use in the manufacture of synthetic resins and plastics. The Association recommended that it continue free for this use. Because butyl stearate is now ruled made in Canada for Customs purposes, it no longer is admissible under tariff item 921, but is dutiable under tariff item 711 at 15 p.c., B.P., 20 p.c., M.F.N.

(1) Transcript, Vol. 60, p. 8968

(2) Same, Vol. 60, p. 8967

The products of interest to Nopco Chemical are:

diglycol laurate	butyl stearate
diglycol oleate	propylolate
diglycol stearate	polyethylene glycol esters
glycerol monooleate	polypropylene glycol esters
glycerol monostearate	sorbitol esters
butyl oleate	

Three companies made a joint submission to the Board on a number of metallic stearates, listed below. The companies are:

H.L. Blachford Limited	Montreal, Quebec
Mallinckrodt Chemical Works Limited	Montreal, Quebec
Witco Chemical Company Canada Limited	Toronto, Ontario

The chemicals mentioned in the brief are all manufactured by one or more of the three companies and there were no other known manufacturers in Canada. While there are "scores of metallic soaps theoretically available, the commercially important members are restricted to the small group of stearates dealt with in this brief." (1)

These products are used in making cement, explosives, greases, lacquer, metal-working paints, paper, rubber and varnishes. They do not have the characteristics of soap, but are used for water repellancy, lubrication, viscosity modification or for stabilization of vinyl resin compositions. Consumption was said to amount in value to about \$1,000,000 per year. Prices provided for the Board's reference showed that aluminum, calcium and zinc stearates were lower in price in Canada than in the United States and that the prices of the other stearates were higher in Canada. More than 90 per cent of sales were said to be of aluminum, calcium and zinc stearates, in the price range of 40 to 42 cents per pound. Prices more generally ranged from 32 cents per pound to 85 cents in both countries. The companies noted that imports from overseas have probably amounted to less than 5 per cent of the Canadian market in recent years and that this "has been brought about by the competitive pricing of Canadian stearates, with corresponding shrinkage of our profit margin." (2)

Except as noted, these stearates are currently imported into Canada under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. and the companies recommended that these rates be continued. Lithium stearate, aluminum distearate and aluminum monostearate are dutiable under item 208t, Free, B.P., 15 p.c., M.F.N. Sodium stearate is entered as a soap under item 228(ii) at rates of 15 p.c., B.P., 20 p.c., M.F.N.; this item is not part of Reference 120. The list of chemicals in which the three companies expressed an interest is as follows:

aluminum distearate	lithium stearate
aluminum monostearate	magnesium stearate
aluminum tristearate	sodium stearate
calcium stearate	zinc stearate
lead stearate	aluminum octoate

(1) Transcript, Vol. 62, p. 9220

(2) Same, Vol. 62, p. 9224

Dibasic lead stearate was brought to the Board's attention by Canadian Titanium Pigments Limited, which was in the process of establishing facilities, at the time of the hearing, to manufacture the product in Canada. At the time of the hearing in September, 1961, the company anticipated being in production within a short space of time. The chemical is used as a stabilizer in polyvinyl chloride resins. There are other stabilizers which were said to be, to some extent, interchangeable so that a market estimate for this one is difficult to make, but the company said "our estimate of the Canadian market for lead base stabilizers indicates a total volume of approximately 800,000 pounds per year."⁽¹⁾ Prices of lead base stabilizers were said to range from 20 to 50 cents per pound, and the sales value of Canadian consumption was estimated at about \$300,000. Given sufficient volume of production, the company reported that it would expect to be at no cost disadvantage producing in Canada.

Dibasic lead stearate is imported free of duty from the United States under tariff item 921 and free of duty as well from the United Kingdom under tariff item 208t (Free, B.P., and 15 p.c., M.F.N.). The company requested that "duty protection be given this stabilizer at the rates of 15% B.P., 20% M.F.N., in common with the rate being recommended by the Industry Committee on various other stabilizers which fall under different headings in the course of these hearings, specifically 29.15, 38.19" and said further, "avoidance of 'end use' items such as item 921, allows the Canadian manufacturer a chance to develop an adequate volume on items for which substitutes (identical or not) are available from abroad."⁽²⁾

Submissions on stearic acid are dealt with under heading 15.10 later in this section of the report.

Atlas Powder Company Canada, Limited submitted a proposal on a group of fatty acid esters of sorbitol. Since these are made by the use of a mixture of fatty acids, the resulting esters are not single chemically defined compounds as required for classification in B.T.N. Chapter 29. Rates of 15 p.c., B.P. and 20 p.c., M.F.N. were recommended by the company for these esters. At the time of the hearing these were imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N., but since that time all of those listed below, with the exception of sorbitan tristearate have been ruled made in Canada and are dutiable under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. The company had previously enjoyed patent protection on these products, but this has expired; other companies were commencing manufacture of the esters in the U.S.A., and the company in Canada regarded the tariff protection as necessary in the light of this development.

The chemicals in which the company expressed an interest are listed below.

sorbitan monolaurate
sorbitan monopalmitate
sorbitan monostearate
sorbitan tristearate

sorbitan monooleate
sorbitan trioleate
sorbitan sesquioleate

⁽¹⁾ Transcript, Vol. 62, p. 9237

⁽²⁾ Same, Vol. 62, p. 9239

These esters were said to account for about 24 per cent of the company's sales of Canadian-made products and about $7\frac{1}{2}$ per cent of the total dollar value of company sales. The esters are oil-soluble and water-dispersible, and are used for emulsions of fats and oils in food, cosmetics, petroleum and other products. Imports were estimated to supply approximately 10 per cent of total consumption; all of these were said to come from the U.S.A.

Capric acid, octoic acid, pelargonic acid and p-tert-butyl benzoic acid were included in a list of chemicals in which Ferro Enamels (Canada) Limited expressed an interest as materials used in the company's manufacture of stabilizers for vinyl type resins.⁽¹⁾ They may be imported under tariff item 216 at rates of Free, B.P. and 15 p.c., M.F.N., and the company requested that they should be free of duty until ruled of a kind made in Canada at which time they should be dutiable at 15 p.c., B.P. and 20 p.c., M.F.N. Temporary tariff item 216e was introduced into the Tariff in July, 1964; it provides duty-free entry for pelargonic acid and octoic acid when for use in the manufacture of stabilizers for vinyl synthetic resins.

The Canadian Pharmaceutical Manufacturers Association submitted to the Board a list of chemicals used by its members in the manufacture of pharmaceutical products and recommended that some end-use treatment be adopted for these chemicals. The Association recommended that rates of Free, B.P. and 15 p.c., M.F.N. should apply when the products are not made in Canada, and for which no other representation was made, and that the heading rates proposed by the Industry Committee (15 p.c., B.P. and 20 p.c., M.F.N.) apply when the products are made in Canada. The list of chemicals in the present heading to which this proposal applies is as follows; those marked with an asterisk are the more important chemicals to members of the Association:

*Acetic acid	Calcium stearate
Acetic anhydride	Cetyl palmitate
Acetomenaphthone	o-Chlorobenzoic acid
Acrylic acid	p-Chlorobenzoic acid
Aluminum acetate, basic	Copper oleate
Aluminum stearate	*Dichloroacetyl chloride
Benzoic acid	Ethyl acetate
Benzyl acetate	Ethyl chloroformate
*Benzyl benzoate	*Ethyl stearate
Benzyl cinnamate	Formic acid
isoButyric anhydride	n-Heptoyl chloride
n-Butyric anhydride	Lauric acid
Calcium propionate	Lead acetate

(1) Transcript, Vol. 165, p. 24407

*Magnesium stearate	Sodium formate
Methyl phenylacetate hydrochloride	Sodium oleate
p-Nitrobenzoic acid	Sodium propionate
*Oleic acid (or 15.10)	Sorbitan monooleate
Potassium acetate	Sodium stearate
*Potassium sorbate	*Sorbic acid
Peracetic acid	Sorbitan monopalmitate
Propionic acid	Sorbitan monostearate
isoPropyl myristate	Stearic acid (or 15.10)
isoPropyl palmitate	Stilboestrol dipropionate
Sodium acetate	Zinc propionate
*Sodium benzoate	Zinc stearate
Sodium n-butyrate	

The Toilet Goods Manufacturers Association was concerned about the possibility that the "n.o.p." provision for essential oils under tariff item 264a could result in certain chemicals being classified in B.T.N. Chapter 29 and thereby excluded from entry under item 264a with the resulting loss of the current end-use privilege. The Association recommended that the "n.o.p." provision should be removed from item 264a or that, since this item is not within the terms of the Reference, a recommendation of similar intent should be made by the Board. The rates of duty of item 264a are Free, B.P., $7\frac{1}{2}$ p.c., M.F.N. The chemicals under the present heading in which the Association was interested are as follows:

amyl butyrate	geranyl formate
amyl valerianate	iso bornyl acetate
benzyl acetate 2nd	iso butyl phenyl acetate
benzyl benzoate	linalyl acetate from Bois de Rose 1st
benzyl propionate	linalyl acetate 75%
bornyl acetate crystalline	linalyl butyrate
butyric acid	methyl benzoate
cedryl acetate	methyl cinnamate
cedryl acetate brut	methyl phenyl acetate
cinnamic acid	octyl acetate
citrovial for soap	para cresol acetate
citronellyl acetate	phenyl acetic acid
ethyl benzoate	phenyl ethyl acetate
ethyl butyrate	phenyl ethyl butyrate
ethyl capronate	phenyl methyl carbinyl acetate
ethyl cinnamate	phenyl propyl acetate
ethyl formaceto	rosacetol
ethyl laurate	terpenyl propionate
ethyl phenyl acetate	terpenyl acetate
ethyl valerate	vetivert acetate
geranyl acetate	

Products listed by W.J. Bush and Company (Canada) Limited and W.J. Bush and Company Limited under B.T.N. heading 29.14, as referred to earlier, are as follows. The companies requested that rates of Free, B.P. and 15 p.c., M.F.N. be continued until the products are made in Canada, at which time rates of 15 p.c., B.P. and 20 p.c., M.F.N. should apply.

Part A - used in the manufacture of flavours and perfumery compounds

amyl acetate	acetyl chloride
amyl butyrate	ammonium benzoate
amyl cinnamate	allyl benzoate
amyl valerianate	amyl benzoate
benzyl acetate	amyl phenylacetate
benzyl benzoate	amyl propionate
benzyl butyrate	anisyl acetate
benzyl cinnamate	benzyl phenylacetate
benzyl formate	isobornyl acetate
benzyl propionate	butyl benzoate
isobutyl phenylacetate	cinnamyl acetate
dihydrocarveyl acetate	cinnamyl butyrate
dimethyl benzyl carbiny l acetate	citronellyl butyrate
ethyl butyrate	p-cresyl acetate
ethyl formate	p-cresyl phenyl acetate
ethyl laurate	ethyl benzoate
ethyl valerianate	ethyl cinnamate
geranyl formate	ethyl o-nanthate
linalyl acetate	ethyl propionate
methyl benzoate	eugenyl benzoate
methyl cinnamate	geranyl acetate
methyl phenylacetate	geranyl butyrate
phenyl acetic acid	geranyl propionate
phenyl ethyl acetate	linalyl butyrate
phenyl ethyl isobutyrate	linalyl propionate
phenoxy ethyl iso butyrate	rhodinyl acetate
terpinyl acetate	vetiveryl acetate
triacetin	
trichloromethyl phenyl	
carbiny l acetate	

Part B - other uses

benzoyl chloride (for chemical manufacture)
 cinnamic acid (for chemical manufacture)
 sodium acetate anhyd. (for photography)

Imports of triacetin were reported to be valued at \$90,000 in 1963.

At the hearing on pesticides, in November 1962, a group of seven manufacturers of pesticides made a proposal concerning a list of biologically active materials for use in the manufacture of pesticide formulations. The companies were:

A.H. Howard Chemical Co. Ltd.	Orangeville, Ontario
Allied Chemical Services Ltd.	Calgary, Alberta
Chipman Chemicals Ltd.	Hamilton, Ontario
Gallowhur Chemicals Canada Ltd.	Lachine, Quebec
Manchester Products Ltd.	Galt, Ontario
Niagara Brand Chemicals	Burlington, Ontario
Green Cross Division	
Sherwin Williams Co. of	
Canada Ltd.	Montreal, Quebec

The companies proposed:

"The signatories of this brief share the view of the Chemical Industry Committee that, when a biologically active chemical, now on Appendix II, is made in Canada, it should become subject to the duty rates which have been recommended for the appropriate B.T.N. heading."(1)

The proposal was based on the belief that a duty on biologically active materials, not made in Canada, would increase the prices of pesticides to Canadian users without producing off-setting advantages for any segment of industry. The products under the present heading are:

Allethrin
Dinitro capryl phenyl crotonate
Erbon
Pyrethrin I
Sodium Dichloropropionate (Dalapon)
Sodium Naphthalene Acetate
Sodium Trichloracetate
Trichlorobenzoic Acid
and its herbicidal salts and esters

FATTY ACIDS AND ACID OILS FROM REFINING
- B.T.N. 15.10

Introduction

The industrial mixtures of fatty acids included in this heading may result from the process of making soaps from fats and oils, be extracted from tall oil or be made by the catalytic oxidation of synthetic hydrocarbons of high molecular weight. Most consist of mixtures of liquids and solids. The liquid part, in turn, consists of crude oleic acid and other liquid acids while the solid part consists mainly of palmitic acid and stearic acid. Such mixtures are made and used in Canada.

Animal fat in the form of inedible tallow is the largest single source material for fatty acids. Prior to the Second World War, most of the tallow was used in soap-making, but since that time it has gained importance for the production of fatty acids. The use of fatty acids gained impetus from the war-time demand for the recovery of glycerine from tallow. During and since the war the use of vegetable oils and their associated fatty acids increased very rapidly, and the mixed fatty acids from the various vegetable sources have become major items of commerce.

When vegetable oils are refined with alkali, the impurities that are removed contain soaps of the fatty acids (soapstocks) which, when acidulated, become a source of the same acids which characterize

(1) Transcript, Vol. 108, p. 16332-3

the vegetable oil. Acidulated soap stocks are the acid oils from refining referred to in the title. These are valuable by-products of the refining process. Additionally, some fatty acids are made from tall oil, a mixture of about equal parts of rosin and fatty acids obtained as a by-product of the manufacture of kraft paper from wood by the sulphate process.

Fatty acids came before the Board under two B.T.N. headings, 15.10 and 29.14; it is necessary, therefore, to differentiate between the fatty acids classified under each. In the Brussels Nomenclature, industrial mixtures of fatty acids are included in heading 15.10, while the single, chemically defined acids are included in 29.14, although a means of distinguishing between mixtures and pure chemicals is not provided. In their submission to the Board dealing with classification, a group of five companies, listed below, suggested that "essentially pure be interpreted to mean not less than 90 per cent of an individual monobasic acid." (1)

The companies concerned were:

Harchem Limited	Toronto, Ontario
Emery Industries (Canada) Limited	London, Ontario
Canada Packers Limited	Toronto, Ontario
Lever Brothers Limited	Toronto, Ontario
Procter and Gamble Company of Canada Ltd.	Hamilton, Ontario

None of these companies expressed an interest, as a manufacturer, in any of the individual fatty acids of heading 29.14. It was stated that the production of materials of a higher purity requires equipment and processes (with corresponding added cost) beyond those needed for the production of fatty acids of lesser purity. The fatty acids of commerce are likely to contain very much less than 90 per cent of any single chemical.

The manufacture of mixed fatty acids was said to constitute the principal business of Harchem and Emery Industries, and to represent a divisional interest of the other three companies. These five, together with Hercules Powder Company Canada Limited, are the only manufacturers of fatty acids in Canada; Hercules manufactures tall oil fatty acids.

Further, the spokesman for the five companies listed above said: "Our recommendation is duty rates of 15 per cent B.P., 20 per cent M.F.N. in both categories, therefore, covering all fatty acids whether they be mixed or pure, because they are all interrelated. Then any exceptions in terms of so-called pure materials would have to be defined; they would have to establish their own criterion of purity and nomenclature." (2) As noted under heading 29.14, Lever Brothers and Procter and Gamble proposed rates of Free, B.P., 10 p.c., M.F.N. for lauric acid of a purity of not less than 90 per cent.

(1) Transcript, Vol. 60, p. 9029

(2) Same, Vol. 61, p. 9088

Tall oil fatty acids are classified differently. Heading 38.05 of the B.T.N. classifies tall oil, but the Explanatory Notes state that "this heading does not include: a) Tall oil fatty acids, separated from most of the resin acids of the tall oil by vacuum distillation or otherwise (heading 15.10)."(1) Tall oil fatty acids, principally a mixture of oleic and linoleic acids, are, therefore, under heading 15.10 in the B.T.N. classification. In the Canadian Customs Tariff, tall oil fatty acids are admitted duty-free under item 585a, "Tall Oil..." If separate provision were to be made for fatty acids derived from tall oil, some criterion of purity would have to be established. At least for some industrial purposes, content requirement of at least 90 per cent fatty acids is apparently necessary for the product to be called tall oil fatty acid, though at times in commerce the term is used to refer to products of lower fatty acid content.

Tariff item 585a was not included in the Minister's letters of reference with respect to Reference 120, Chemicals; it was, however, included in Reference 131, Oil-Seeds, Vegetable Oils and Related Products. In its report on that Reference, the Board wrote: "The Board considers that this item is more appropriately dealt with in the context of Reference No. 120 - Chemicals. It will therefore be covered in the Report on Reference No. 120."(2) The Board formally brought item 585a under consideration in Reference 120. In an earlier statement on the subject, Charles Albert Smith Limited submitted that:

"any discussion on the subject of tall oil fatty acids does not belong under heading 15.10, but rather under heading 38.05. Neither tariff item 585a or Brussels heading 38.05 are matters on which the Minister has asked for a review in this reference. We would, therefore, respectfully submit that the tariff status of tall oil (tall oil fatty acids) remain as presently covered by tariff item 585a free from all countries."(3)

The outline of fatty acids in this section of the report deals essentially with the mixtures, including tall oil fatty acids, classified by B.T.N. heading 15.10; a more general discussion of tall oil is presented under heading 38.05, in the section of the report on Chapter 38.

Market information is not readily available on particular mixtures of fatty acids. Vegetable oils are refined in batch processes which permit the refiner to switch readily from one vegetable source to another depending upon availability, price and the demand for the group of products derived from the refining process. Once more, tall oil is an exception; it is not processed by the refiners of vegetable oils but in specialized plants which were said to be more complex and to represent a much higher ratio of capital investment to employee.

(1) Explanatory Notes, Vol. 1, p. 353

(2) Tariff Board Report, Reference No. 131, p. 97

(3) Transcript, Vol. 62, p. 9357

The Canadian market for fatty acids other than tall oil is estimated to be in excess of 30 million pounds with a commercial value of more than \$4 million. Prices of the fatty acids are generally in the range of 8 to 16 cents a pound. Canadian production of stearic acid is estimated to be in excess of 12 million pounds, most of which is hydrogenated; imports of stearic acid, in 1964, were nearly 1.8 million pounds valued at \$261,000. Animal fats appear to account for about half of the remaining fatty acids, in quantity terms; the vegetable fatty acids, because of their higher average values, have a somewhat greater total value. Data on Canadian production of tall oil fatty acids are not publicly available; imports of tall oil fatty acid were estimated, at the public hearing, to be about 4 million pounds, which would have a value of about \$500,000.⁽¹⁾ Imports of all forms of tall oil and tall oil pitch, in 1964, were in excess of 12 million pounds. These imports would include tall oil used as a raw material by the Canadian producer, fatty acids of grades not made in Canada and any other forms of tall oil complementary to Canadian production, as well as any products competitive with Canadian produced tall oil products. By far the largest portion of these imports are not directly competitive with Canadian tall oil products. Imports of oleic acid, in 1964, were reported to be 448,000 pounds, valued at more than \$82,000. Imports of lauric acid in 1964 were 778,500 pounds, valued at \$217,000.

Imports of Oleic and Stearic Acids,
1960-64

<u>Year</u>	<u>Stearic Acid</u>		<u>Oleic Acid</u>	
	<u>'000 lb.</u>	<u>\$'000</u>	<u>'000 lb.</u>	<u>\$'000</u>
1960	1,518	192	328	56
1961	656	87	598	104
1962	1,080	135	453	87
1963	1,456	159	538	104
1964	1,789	261	448	82

Source: D.B.S., Trade of Canada, Imports, s.c. 2291, 2292

Although it is understood that there are some exports of fatty acids, from time to time, no data are available on them; exports are believed to provide only a small outlet for Canadian production.

Tariff Considerations

Because most representations were made within the context of the broad groupings of products rather than for individual chemicals, an outline is first given of the general tariff considerations, followed by information on the particular products that were the subject of specific representations before the Board.

⁽¹⁾ Transcript, Vol. 104, p. 15753, 15771

Most fatty acids, such as those derived from cottonseed oil, coconut oil, corn oil, linseed oil, soya bean oil and palm oil are dutiable under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N.; some are understood to be admitted at lower rates under items that provide for the related vegetable oils, for example, tariff items 276a to 276g inclusive. Stearic acid is the only fatty acid named specifically in the Canadian Customs Tariff. When imported by manufacturers of candles or crayons for use only in their own factories in the manufacture of candles or crayons it may be entered into Canada duty-free under all Tariffs under item 215a. Stearic acid, n.o.p. may be entered under tariff item 215 at rates of Free, B.P. and 12½ p.c., M.F.N. Tall oil fatty acids are currently free of duty under tariff item 585a as tall oil.

The Board in its report on Reference No. 131, Oil-Seeds, Vegetable Oils and Related Products, noted certain distinctions in products, as follows:

"Acid Oils: Acid oils are prepared by the treatment of soap stock with mineral acid. Any mixture of glycerol esters and fatty acids which contains by weight neither less than 30% or more than 90% of free fatty acid should be classified as an acid oil."

The report continues:

"The refiners expressed the view that soapstocks and acid oils should be dutiable at the same rates as the crude oils from which they have been derived, because of their origin and the similarity of some of their uses. No opposition was expressed to these proposals."⁽¹⁾

This distinction thus recognizes the 90 per cent criterion as the dividing line between mixtures of fatty acids and acid oils, such as those of heading 15.10, and products of higher purity, such as the separate chemicals of heading 29.14. That report recommended rates of Free, B.P., 10 p.c., M.F.N. for the acid oil group of products.⁽²⁾ No recommendation was made in that report for the fatty acids of a purity of 90 per cent or higher. The Board's recommendations, therefore, would include most mixtures of fatty acids of B.T.N. heading 15.10 if the line of demarcation is 90 per cent purity. Any fatty acids of that or higher purity, by some of the proposals before the Board under Reference 120 - Chemicals, would be classified to heading 29.14. Tall oil fatty acids do not come within the Board's definition of acid oils above and, therefore, require separate consideration.

In Reference 120 - Chemicals, the producers of the mixed fatty acids proposed rates of 15 p.c., B.P., 20 p.c., M.F.N. for the products of heading 15.10, and proposed that these rates should generally apply to the individual fatty acids of heading 29.14. They stated:

(1) Tariff Board Report, Reference No. 131, p. 53

(2) Same, Reference No. 131, p. 73

"Fatty acids qualifying for entry under our interpretation of 29.14 are not presently made in Canada, but know-how capacity and most facilities are available should a market develop. In most cases, if these types of acids are imported, they would directly compete with products now manufactured in Canada... According to our interpretation of Brussels Nomenclature, all fatty acids now made in Canada qualify for classification under Brussels heading 15.10. They are current items of commerce. Essentially pure fatty acids would qualify for classification under Brussels heading 29.14. While generally these are not commercially significant now in Canada, they may be so in the future. At that time they will compete with the products we make. For purposes of classification, we would suggest that essentially pure be interpreted to mean not less than 90 per cent of an individual monobasic acid.

"As an example, commercial stearic acid is approximately 50 per cent...palmitic, and 50 per cent...stearic, and would be classified under Brussels heading 15.10. Should a product be manufactured containing not less than 90 per cent...palmitic then this would be classified under Brussels heading 29.14."(1)

Fatty acids are used as intermediates in the manufacture of a wide variety of products, including soaps and detergents, rubber, greases, metallic soaps, resins, adhesives, pharmaceuticals, cosmetics and other consumer goods. This group of companies maintained that there is adequate production of fatty acids in Canada and that, consequently, there is no longer any need to maintain end-use provisions, the principal means by which these products may be imported into Canada at low rates of duty. The companies recommended that tall oil fatty acids should "be included in the basket rate under Brussels heading 15.10."(2)

This group of companies recommended that fatty acids should be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N., saying that these rates "are necessary to maintain a profitable and competitive fatty acid industry capable of expansion with the growth of Canadian markets."(3) They also recommended that duty-free entry of fatty acids under end-use items be eliminated and that "effective protection can best be administered by basket procedure."(4) The companies made a similar proposal with respect to a number of other end-use items not directly or entirely related to the fatty acids of heading 15.10. These others included: item 262, chemical compounds for removing water and salts from crude petroleum oils; item 270, oils for use in the concentration of ores; item 664(1), crude glycerine for use in the manufacture of refined glycerine; Extract item 711, hydrolized animal matter for use as a retarder for calcined gypsum; and item 851, materials for use in the manufacture of synthetic rubber. The companies would continue tariff item 664(1), delete the extract of item 711, and restrict the other items to products "when of a class or kind not made in Canada."(5)

(1) Transcript, Vol. 60, p. 9029

(2) Same, Vol. 60, p. 9037

(3) Same, Vol. 60, p. 9038

(4) Same, Vol. 60, p. 9039

(5) Same, Vol. 62, p. 9201

A spokesman for the companies said that rates of 15 p.c., B.P., 20 p.c., M.F.N. were necessary because of the cost advantages enjoyed by foreign producers. These were said to include lower cost tallow and supplies such as nickel catalysts and solvents; lower freight costs in the U.S.A., and economies of scale because of longer runs. In addition, the spokesman suggested that "Foreign producers now enjoy a significant portion of the Canadian market by virtue of their lower costs and our ineffective tariff protection."(1)

The ineffective tariff protection was said to stem in part from duty-free entry or lower rates of duty associated with end-use tariff items.

An assessment of these disadvantages and needs is very difficult to make with any precision because of a number of complicating factors. The extent of substitutability of one fatty acid for another was the subject of much discussion, partly in terms of the various grades of one product such as stearic acid or tall oil fatty acid, and partly in terms of the interchangeability in use of one acid for another. In this latter regard, for example, there was considerable discussion about the extent to which tall oil fatty acid was competitive in use with other fatty acids. An important disadvantage for some uses was said to be the resin acid content, the presence of unsaponifiables and the colour of tall oil. Apart from stearic acid, tall oil fatty acids are the only ones for which imports appear to be substantial. Some of the imports, moreover, were said to be necessary in order to obtain particular grades or types of fatty acid.

With respect to stearic acid, it was noted that imports from Australia had come to account for about one third of total imports. The Australian product was said to be lower in price than that from Canadian production, or from the U.S.A., with a consequent depressing effect on market prices in this country. The situation with respect to stearic acid is discussed further below. However, it might be noted that imports of stearic acid are mainly from the U.S.A., and enter under item 215 for which the M.F.N. rate is 12½ p.c.

The incidence of freight cost is difficult to measure, and no detailed information on it is available to the Board. Most of the Canadian market, however, is in Ontario and Quebec, and the fatty acid producers are located in Ontario. It would seem, therefore, that over a substantial portion of the Canadian market the producers in Canada should enjoy a freight cost advantage.

The fatty acids listed in the proposal by the fatty acid producers were:

Castor fatty acids
Coconut fatty acids
Hydrogenated coconut fatty acids
Corn fatty acids
Cottonseed fatty acids
Linseed fatty acids
Mixed fatty acids
Oleic fatty acids

Tallow fatty acids
Hydrogenated tallow fatty acids
Stearic fatty acids
12-hydroxy stearic acids
Soyabean fatty acids
Palm fatty acids
Palmitic fatty acids
Tall oil fatty acids

(1) Transcript, Vol. 60, p. 9038

Stearic acid came before the Board as commercially the most important of the fatty acids, with the possible exception of tall oil fatty acids. The request by the producers of fatty acids for rates of 15 p.c., B.P., 20 p.c., M.F.N. has been noted above; three other submissions dealt specifically with stearic acid. These are discussed below.

Commercial stearic acid, as a naturally occurring mixture in tallow, contains approximately 45 per cent stearic acid and 55 per cent palmitic. When hydrogenated, the product may contain 60 or 70 per cent stearic acid.

The Rubber Association of Canada noted the use of stearic acid in the production of rubber goods and estimated that consumption "in the Canadian rubber industry averages at least 3,000,000 pounds valued at approximately \$300,000 annually."⁽¹⁾ The Association said that stearic acid for use in the rubber industry would be entered under item 215 at rates of Free, B.P. and 12½ p.c., M.F.N. Although the Association stated that the rubber industry's requirements of stearic acid are purchased almost entirely from Canadian producers, it maintained that the increase in rates suggested by the Industry Committee, to 15 p.c., B.P. and 20 p.c., M.F.N., "could result in an appreciable increase in the rubber industry's costs of production...the rubber industry is hard pressed to meet severe and steadily mounting import competition and cannot afford to be burdened with additional cost handicaps."⁽²⁾

Polymer Corporation Limited listed oleic acid and stearic acid as two products in which it was interested under end-use item 851, which permits free entry of materials for use in the manufacture of synthetic rubber. The fatty acid producers estimated that about one million pounds of stearic acid are used each year in the manufacture of synthetic rubber, and suggested that item 851 apply only to goods not made in Canada.

The Candle Manufacturers Association of Canada presented a submission to the Board on stearic acid. Although the presentation was made in terms of the single product, the spokesman for the five companies previously mentioned expressed the opinion that the product used by the candle makers is actually the commercial grade and, as such, is a mixture of fatty acids properly classified under heading 15.10. This opinion was based partly on the fact that the candle makers use some Canadian-made product which is not the single, chemically defined product. The seven candle makers represented in the joint brief were:

F. Baillargeon Ltd.	Montreal, Quebec
Elói Baillargeon Ltd.	Montreal, Quebec
Will & Baumer Candle Co. Ltd.	Montreal, Quebec
J.E. Mailloux Ltd.	St. John, Quebec
J.L. Lasnier Reg'd	Longueuil, Quebec
J.B. Lasnier, Père Enr.	Levis, Quebec
S. Rivest, Enr.	Montreal, Quebec

⁽¹⁾ Transcript, Vol. 61, p. 9166

⁽²⁾ Same, Vol. 61, p. 9167

The members of the Association, in 1960, used about 170,000 pounds of stearic acid, valued at about \$23,000. Of this amount, about 55,000 pounds were imported (valued at about \$8,000) and some 115,000 pounds were of domestic origin with a value of about \$15,000.⁽¹⁾ Thus, the average value of the Canadian material was about 13 cents a pound, and that of the imported, about 14½ cents a pound. Their spokesman said that the members use Canadian material when they can, but that sometimes they had to use stearic acid imported from the U.S.A. because the Canadian product did not meet their specifications. On the other hand, the domestic manufacturers of the acid maintained that their product resulted from carefully controlled procedures and that any inadequacy stemmed from the lack of proper controls by the candle makers. The candle makers said that they use the acid from the U.S.A. in preference to Canadian or Australian acid in spite of its higher price.

In 1963, the latest year for which data are available, most imports of stearic acid were from the U.S.A.; about one third of the total was from Australia and minor quantities came from the U.K., Belgium and Luxembourg. Duty was paid on imports from the U.S.A. at the rate of 12.5 per cent, indicating that imports from that country were not entered under end-use item 215a for making candles or crayons, but under item 215, for other uses such as noted above by the rubber industry. The average value of imports in 1963 was 11 cents per pound and in 1964 it was 16 cents per pound. The Canadian published price for stearic acid, distilled, triple pressed, in 5-ton lots delivered in Ontario and Quebec in January, 1963 was 20¾ cents per pound; it is probable that these prices do not refer to comparable grades of acid. The Candle Manufacturers Association of Canada requested the continuation of the duty-free provisions of tariff item 215a on stearic acid when for use in making of candles or crayons.⁽²⁾ No representation on crayons was heard.

Harchem Limited made a statement, on behalf of the five Canadian fatty acid producers, on 12-hydroxystearic acid. The commercial product was said to be 87 per cent hydroxystearic acid, the balance being stearic acid. As a mixture of acids, the company submitted, it is classified by B.T.N. heading 15.10, and should receive the same rates of duty as other fatty acids under that heading.⁽³⁾ The chemically defined product is classified by heading 29.16, and the company noted the possible applicability of that heading.

Naugatuck Chemicals mentioned cocoonut fatty acids with respect to the company's general statement that "We take no issue with the rates which are being proposed to you by the producers of these materials, provided that the Board also recommends those rates which will be proposed to you for the products which we manufacture."⁽⁴⁾

Hercules Powder Company (Canada) Limited, as the only Canadian producer, made a presentation on the subject of tall oil fatty acids. The company pointed out, as previously noted, that these currently are entered into Canada under tariff item 585a and that, if this item were brought within the terms of the Reference, tall oils as well

(1) Transcript, Vol. 61, p. 9172

(2) Same, Vol. 61, p. 9168

(3) Same, Vol. 61, p. 9161; Vol. 66, p. 10089

(4) Same, Vol. 60, p. 8892

as tall oil fatty acids would be included. In this event, the company requested continued duty-free entry of the tall oil, which it uses as the raw material for refining into tall oil fatty acids. The company stated that there is an insufficient economic supply of crude tall oil from Canadian kraft paper operations, partly because not all of the paper companies recover crude tall oil and partly because of the distances involved in getting tall oil to the Hercules plant from some of the kraft paper mills. Moreover, crude Canadian tall oil was said to contain a much higher proportion of unsaponifiable material than some supplies available from the U.S.A. Crude Canadian tall oil, for example, was said to contain as much as 30 per cent unsaponifiables compared with possibly 10 per cent in some U.S. products. Hercules Powder also produced from tall oil, in addition to the fatty acids, distilled tall oil, rosin, light ends and pitch. All of these except rosin are offered for sale; the rosin is used captively by the company to make rosin size for the paper industry. The rosin was referred to as of co-product interest to the company.

The company further requested the Board to recognize the existence of different grades of tall oil fatty acids and to set tariff rates on the basis of grade. For any grade, as specified by rosin content, colour and unsaponifiable content, that is not made in Canada, the company suggested the continuation of duty-free entry; for grades that are made in Canada it suggested rates of 15 p.c., B.P. and 20 p.c., M.F.N. In support of this proposal, the company submitted that:

"The commercial fractionation of tall oil cannot be considered a complete separation to its chemical components but rather a refining process in which the compositions of the resulting products differ from that of the original material mainly in the relative percentage of the components...

"The particular specifications of each fraction or grade of tall oil fatty acids determine its end use and value...While each consumer attempts to use the least refined grade possible because of its concomitant lower price, there are many large volume uses where the most highly refined grades are required by the technology of the consumer...

"We, therefore, believe that each of the various grades should be considered as a separate item of commerce."(1)

Earlier in the hearing, the spokesman had noted that commercial tall oil fatty acids were known to contain anywhere from 40 per cent rosin acids to less than one per cent rosin acid.

No precise tariff specifications were suggested for different grades of tall oil fatty acids. However, it was stated that only one grade was made in Canada. The situation at the time of the hearing in 1961, was described by the spokesman for Hercules Powder Company (Canada) Limited in the following way:

"Thus far, our Burlington plant has successfully produced commercial quantities of tall oil fatty acids as low as 4 per cent in rosin content. A few runs containing only 1 per cent rosin have been made at a prohibitively low yield. We have not yet, however, been able to match the imported grades of lightest colour and lowest content of unsaponifiable in either 1 per cent or 4 per cent rosin grades. Furthermore, we are at present uncertain that production of a grade containing less than 2 per cent unsaponifiables and less than 1 per cent rosin will

(1) Transcript, Vol. 62, p. 9276

prove practicable in our present equipment. If our further efforts in this direction are successful, it is entirely possible that we will utilize present facilities and current supply of crude tall oil to produce this grade even at the expense of current production of less refined grades."⁽¹⁾

The company's product was said to be about 91 per cent fatty acids; in addition to the rosin acid referred to in the statement, the product would contain unsaponifiables.

The three grades made by the U.S. company were described as containing respectively one, four and five per cent rosin acid. The spokesman noted that, in exporting a product containing less than five per cent rosin acid to five countries using the Brussels Nomenclature, the U.S. company found that four of the countries classified the product under heading 15.10, while the other classified the same material under heading 38.05.

Hercules Powder indicated that two thirds of the Canadian market in 1959, was for the fatty acid containing one per cent rosin acid which was not made in Canada. The company indicated that it had requested that tall oil fatty acid containing 10 per cent or more rosin should be ruled made in Canada. The spokesman proposed that all tall oil fatty acids containing 90 per cent or more of fatty acids could be regarded as not made in Canada in substantial quantity, and he proposed duty-free entry for these.

At a later hearing on tall oil, in November, 1962, the spokesman expressed the matter in the following manner:

"We suggested the Duty free rates be continued on any grade of tall oil fatty acids specified by rosin content colour and unsaponifiable content until such time as made in Canada."

The spokesman went on:

"soon we will be straightened away as to what products we are definitely going to make in Canada for a long while, at which time briefs will then be given for application for made in Canada status. We haven't urged that state as yet, so that we continue on the same basis as we recommended before, that the duty remain free."⁽²⁾

Any products that become ruled made in Canada would be dutiable, under the company's proposal, at 15 p.c., B.P., 20 p.c., M.F.N.

Considerable discussion arose concerning the classification of the products in terms of their content of fatty acids, rosin acids, unsaponifiables and colour designation. The above quotation refers to the last three mentioned specifications, but the standards of the

⁽¹⁾ Transcript, Vol. 62, p. 9281

⁽²⁾ Same, Vol. 104, p. 15721

American Society for Testing and Materials (ASTM) refer to the fatty acid content. These standards were more generally accepted by the parties at the public hearing on tall oil. The ASTM standards for tall oil fatty acids are given in the following terms:

"The class of products generally containing 90 per cent or more fatty acids obtained by fractionation of crude tall oil. The fatty acids are a mixture of oleic and linoleic acids with lesser amounts of saturated and other unsaturated fatty acids. The remainder consists of rosin and neutral materials."⁽¹⁾

It will be noted that this definition is expressed mainly in terms of the minimum fatty acid content, although it refers also to the source of the fatty acids. Not all mixtures of fatty acids and the relevant other materials, therefore, would meet these specifications. As noted above, Hercules Powder produces at Burlington, Ontario, a product that exceeds the minimum fatty acid content of this definition.

Because of the competitiveness which they considered that tall oil fatty acids had with other fatty acids, the five producers of other fatty acids proposed that tall oil fatty acids which met the above specifications should be dutiable at 15 p.c., B.P., 20 p.c., M.F.N.⁽²⁾

The Canadian Manufacturers of Chemical Specialties Association submitted that tall oil fatty acids are tall oil. The Association suggested that refined tall oil includes, at one extreme, a product which is high in rosin acid content as opposed to fatty acid content and, at the other extreme, a product having a high percentage of fatty acid as opposed to rosin acid. "At these extremes and in between the product is tall oil...There is no line between tall oil and tall oil fatty acid. Tall oil fatty acid is tall oil." The Association maintained that tall oil fatty acids should contain at least 99 per cent of fatty acids "or the product cannot be used as a true tall oil fatty acid because of high rosin, sterol and unsaponifiable content."⁽³⁾ As a result, the Association proposed that tall oil or tall oil fatty acids with 99 per cent or less fatty acid content be permitted duty-free entry into Canada.

Three companies that are members of the Chemical Specialties Associations were associated, at the later hearing on tall oil, with a somewhat different proposal submitted by four companies. These were: Cartier Chemical Company, Limited, Lachine, Que.; the R.N. Hollingshead Corporation of Canada Ltd., Bowmanville, Ont.; Dustbane Manufacturing Company Ltd., Ottawa, Ont.; Tennant Smith Limited, Toronto, Ont. The proposal by these companies was that tall oil with a fatty acid content

(1) American Society for Testing and Materials, Standard Definition of Terms Relating to Naval Stores and Related Products; ASTM Designation: D804-63, Philadelphia, Pa.; Transcript, Vol. 104, p. 15696-7

(2) Transcript, Vol. 104, p. 15752

(3) Same, Vol. 62, p. 9328, 9330

of at least 94 per cent be duty-free. The companies submitted that "The Canadian Chemical Specialty Manufacturing Industry cannot acquire from any Canadian fatty acid producer a product made in Canada that can be substituted for the particular specification of Tall Oil Fatty Acid which they require."(1)

The Canadian Paint Varnish and Lacquer Association submitted a brief on those tall oil fatty acids used by its members in the manufacture of alkyd resins for use in paint. The acids used by this industry were said generally to contain 4 per cent, $1\frac{1}{2}$ per cent or 1 per cent rosin and to have a colour value which meets certain specifications. The Association said that none of the tall oil fatty acids within this range is made in Canada and that the industry's requirements are imported from the United States. Annual consumption, for captive use and for sale to other paint companies, was said to be approximately 4 million pounds. The Association's recommendation was as follows:

"(a) A satisfactory description for tall oil fatty acids designed for alkyd resin use be established

(b) Until such time as they are commercially available from domestic sources, these grades of tall oil fatty acids be dutiable at rates of zero per cent B.P. -- zero per cent M.F.N. under B.N. chapter 15.10..."(2)

The spokesman for the Association expressed the opinion that the members would experience no difficulty if the various forms of tall oil, including tall oil fatty acids, should remain classified as they now are, under tariff item 585a. He said:

"Our concern is more that there is a category of product which is known as fatty acids, these being chemicals, and should, for example, Brussels Nomenclature be adopted and taken in its entirety, and if chapter 15.10 were included, but excluded from that chapter were the tall oil fatty acids, this wouldn't be logical; it wouldn't be recognizing the facts so far as the chemistry of these products are concerned."(3)

At the hearing on tall oil in November, 1962, five companies, basically importers, recommended that tall oil and tall oil fatty acids remain duty-free under tariff item 585a, or be listed, duty-free, under an item like B.T.N. heading 38.05. The companies are: Apco Industries Limited, Leaside, Ont.; Drew Brown Limited, Toronto, Ont.; L.V. Lomas Chemical Company Limited, Downsview, Ont.; Standard Chemical Limited, Toronto, and Tennant Smith Limited, Toronto. The companies suggested that:

(1) Transcript, Vol. 104, p. 15785

(2) Same, Vol. 62, p. 9346

(3) Same, Vol. 62, p. 9354

"These products cannot be duplicated in their entirety for a number of important applications by a similar combination of mixed Fatty Acids, and unsaponifiables with the addition of a greater or smaller amount of rosin."(1)

The spokesman for the companies stated that:

"Unfortunately, to date, the Hercules Powder Company in Burlington have not been in a position to produce the quality to meet many higher standards."(2)

It will be noted that, although the companies referred to certain high quality grades that were not made in Canada, their proposal for duty-free entry was for all tall oil and tall oil fatty acids, and was not confined specifically to products not available from Canadian production. They did observe that the Canadian producer likely would seek protection on products or grades of products as they became made in Canada.

The five producers of other fatty acids did not agree with the statement that tall oil fatty acids had an important range of uses which depended upon unique qualities. The discussion suggested that in many instances the demand for the tall oil fatty acids rested upon price considerations.

Charles Albert Smith presented a statement which referred to the company as a leading importer of tall oil for resale. The company proposed that the existing duty-free provisions of tariff item 585a be left unchanged. (3)

In summary, the expressions of interest, apart from those on tall oil, generally favoured the classification of mixtures of fatty acids with a free fatty acid content of not more than 90 per cent by weight of any single fatty acid to an item like heading 15.10 of the B.T.N. If there is present 90 per cent or more of a single chemically defined fatty acid, the classification should be under an item like heading 29.14. Although some fatty acids are ruled "made in Canada" for Customs purposes, those which would qualify under heading 29.14 were said to be generally not made in Canada. The mixed fatty acids which would qualify under heading 15.10 are made in Canada and satisfy by far the largest part, more than 80 per cent (including tall oil fatty acid) of Canadian requirements. The Board recommended, in its report on Reference No. 131, that acid oils of vegetable origin with a free fatty acid content of less than 90 per cent be dutiable at rates of Free, B.P., and 10 p.c., M.F.N. This recommendation probably would cover a substantial portion of Canadian production of vegetable products also known as "mixed fatty acids". Some of the consumers, however, use products of higher purity of a single fatty acid that could be regarded as separately defined fatty acids of B.T.N. heading

(1) Transcript, Vol. 104, p. 15790

(2) Same, Vol. 104, p. 15791

(3) Same, Vol. 62, p. 9357

29.14. The producers of mixed fatty acids in Canada, although not generally providing products of the purity of a single fatty acid, proposed rates of 15 p.c., B.P., 20 p.c., M.F.N. for the products of heading 29.14 as well as for those of heading 15.10 because of the competitive nature of these products.

The producers of mixed fatty acids in Canada did not indicate, in any detail, why the proposed rates of 15 p.c., B.P., 20 p.c., M.F.N. were appropriate specifically for the products of heading 15.10 or those of heading 29.14, though they did suggest that the Canadian producers were at a cost disadvantage. Many consumer interests indicated that duty-free entry should be continued; some suggested that this could be accomplished by continuation of the present end-use items.

As noted in some detail above, the situation with respect to tall oil fatty acids is different from that for other fatty acids. The proposals, in the main, were that tall oil products with a fatty acid content of 90 per cent or more be classified in an item like heading 15.10 of the B.T.N., and that products with a lower fatty acid content be classified in an item like heading 38.05. Rates of 15 p.c., B.P., 20 p.c., M.F.N. were proposed for tall oil fatty acids by the five producers of other fatty acids and were proposed for any grades made in Canada by the one producer of tall oil fatty acids, with duty-free entry for other grades. Some consumers and some importers proposed duty-free entry, to be achieved, by some proposals, by retention of existing item 585a.

POLYACIDS AND THEIR ANHYDRIDES, ACID HALIDES,
ACID PEROXIDES AND PERACIDS, AND THEIR HALOGENATED,
SULPHONATED, NITRATED OR NITROSATED DERIVATIVES - B.T.N. 29.15

The Brussels Nomenclature divides the chemicals of this heading into two groups; the first, Acyclic Polyacids, includes oxalic acid, succinic acid, adipic acid, maleic acid and maleic anhydride while the second, Aromatic Polyacids, includes phthalic acids and phthalic anhydride.

A large number of the chemicals named in the course of the hearings were in a group collectively known as plasticizers. These are dealt with later in this section.

In 1962, the value of shipments of all chemicals of this heading was in excess of \$10 million, slightly more than 6 per cent of the value of shipments of the chapter as a whole. However, in addition to sales, some of the products have substantial captive use, far greater in magnitude than the market. Adipic acid, phthalic anhydride and the plasticizers as a group were the most significant materials in the heading.

ADIPIIC ACID

The Product, Industry and Market

Adipic acid occurs as colourless to yellowish crystals or crystalline powder. It is soluble in alcohol and ether, slightly soluble in water. Only one grade exists: technical, 99.5 per cent pure.

In the manufacturing process, air oxidation converts cyclohexane to a mixture of cyclohexanol and cyclohexanone, and this mixture is further oxidized with nitric acid, under controlled conditions of temperature and pressure, to adipic acid. Another process, not used in Canada, differs from this mainly in the use of acetic acid with a catalyst in place of nitric acid.

Adipic acid is made in Canada only at the Maitland, Ontario, works of Du Pont of Canada Limited. The first sales from the company plant were in 1954. Du Pont and Chemstrand are the major producers in the United States (210 and 200 million pounds per year capacity, respectively in 1962) and there are three other producers in the U.S.A. with capacities, in 1962, of 20, 25 and 30 million pounds annually, for a total capacity in that country of 485 million pounds. The capacity of the Canadian plant is "considerably larger than some of the American producers and considerably smaller than some of the others."⁽¹⁾ Domestic capacity was said to be adequate to satisfy the entire Canadian demand.

⁽¹⁾ Transcript, Vol. 65, p. 9692

Over 95 per cent of the adipic acid produced in Canada is used captively by Du Pont in the manufacture of the nylon 6/6 intermediate at Kingston, Ontario.(1) A similar high proportion is used in the United States for the same purpose. In Canada, the remainder is used in plasticizers and some other minor uses; in the U.S.A. these minor uses include synthetic lubricants, alkyd resins and food and pharmaceutical applications.

It is only for uses other than in nylon intermediates that adipic acid is imported. Although separate import data are not generally available for this commodity, it was made clear at the hearing that the volume imported is negligible. Similarly, although Du Pont's presentation noted that the acid is exported from Canada, no statistical data are published. However, both imports and exports have been insignificant in comparison with Canadian production and use. Du Pont did suggest that there was a threat of competition from imports resulting from a world-wide over-capacity in production facilities.

The spokesman for Du Pont of Canada said that adipic acid in Canada has been priced at about the same level as in the United States, allowing for the rate of exchange between the currencies of the two countries. To avoid frequent price changes in response to slight movements in the rate of exchange, the Canadian price was said to be, generally, slightly below the U.S. price. As shown in the following table, the prices in the Du Pont presentation are somewhat below the published Canadian prices, and the published Canadian prices, in all but two years, have exceeded the U.S. price. Contractual arrangements might very well account for the lower than published prices.

Adipic Acid Prices, Canada and the United States,
1959-65

	<u>CANADA</u>		<u>U.S.A.</u>	
	Published	Submitted		U.S.¢
	- Cdn. cents per lb. -			
1959	32.25	30.6	30.9	32.25
1960	32.25	30.6	31.3	32.25
1961	32.25	30.6 - 29.0	32.7	29.0
1962	32.25		31.5	29.0
1963	32.		31.3	29.0
1964	32.		31.3	29.0
1965	25.		31.4	29.0

Conversion of \$U.S. to \$ Canadian at annual average noon rates of exchange; Canadian prices, truck load delivered, Ontario and Quebec; U.S. prices, car loads, delivered

Source: Canadian published, Canadian Chemical Processing; Submitted, Transcript, Vol. 65, p. 9684; U.S. prices, Oil, Paint and Drug Reporter

(1) Transcript, Vol. 65, p. 9691

Tariff Considerations

Adipic acid is named in tariff item 923 which allows free entry into Canada when the acid is imported by manufacturers of synthetic resins, for use exclusively in the manufacture of synthetic resins, in their own plants.

Du Pont of Canada Limited, the only company appearing before the Board with a presentation on adipic acid, recommended rates of 25 p.c., B.P. and 30 p.c., M.F.N. The company made a general submission on nylon intermediates and nylon salt; the arguments are dealt with more fully with some of the intermediates of heading 29.22. The company argued that, because by far the larger part of adipic acid is used to make nylon intermediate chemicals and only a relatively small part is used for other purposes, the rate of duty should be based on the need to protect nylon intermediates.⁽¹⁾ Protection is needed, it was said, against potential competition from imports from countries where there is large over-capacity and where costs of production are lower.

The overwhelming share of adipic acid is made and used in Canada by Du Pont in making nylon intermediates; less than 5 per cent is traded commercially for other purposes. If a competitor company wished to produce nylon 6/6 by importing the intermediates, it would have to obtain, in addition to adipic acid, hexamethylene diamine with which to react adipic acid to make nylon 6/6 salt. It could, alternatively, import the salt. The submission by Du Pont was that similar protection should apply at all stages of nylon production in order to ensure than any company establishing facilities to produce nylon end-products had an incentive to secure its materials from Canadian production.

This argument presupposes that there is an inducement to import in the absence of such rates of duty. This inducement might arise because of higher prices in Canada resulting from higher costs of production or from distress selling abroad, or it might arise because of corporate relationships which resulted in using imported supplies even though the price of the Canadian product was no higher. Canadian prices, for large quantity purchases, do not appear to be higher than U.S. published prices though, of course, sales may be made in the U.S.A. at prices below those published. Du Pont of Canada did express concern about the availability of nylon salt or intermediates at distress prices because of world over-capacity. This factor is potentially present, in the short-run, for a wide range of products because of the way in which increments are added to capacity. No direct relationship was drawn between the proposed rates of duty and the over-all disadvantage, through time, which the company thought existed.

The company admitted that the price of adipic acid for other uses, in particular plasticizers, might be allowed to rise under the protection of the Tariff. Substitution of other plasticizers would operate to prevent such a rise. The proposed tariff would, however, give added advantage to the existing nylon producer, by helping to

(1) Transcript, Vol. 65, p. 9682

ensure that other producers of nylon 6/6 or its end-products obtained the salt or the intermediates from Du Pont of Canada, or bore the necessity of higher cost imports or the heavy capital cost of producing the intermediates. The company stated that its objective was to secure the market not to raise prices.

The Canadian Pharmaceutical Manufacturers Association listed adipic acid, recommending some end-use treatment for chemicals used in the manufacture of pharmaceutical products. The Association suggested that rates of Free, B.P. and 15 p.c., M.F.N. should apply when the chemicals are not made in Canada and that, when they are made in Canada, rates of 15 p.c., B.P. and 20 p.c., M.F.N. should apply.

PHTHALIC ANHYDRIDE

The product is a white crystalline material solidifying at 131°C, produced by the catalytic oxidation of naphthalene or ortho-xylene. It is sold normally in flake form in eighty pound bags or as a liquid in special tank cars or trucks. It has been produced in Canada since 1941 when the plant of Dominion Tar and Chemical Company began operation; that plant has been very substantially enlarged by three expansions and, in addition, the other producers have begun operations.

At the time of the hearing, phthalic anhydride was made in Canada by Dominion Tar and Chemical Company Limited, Toronto, Ontario and by Reichhold Chemicals Canada Limited at Ste. Therese de Blainville, Quebec. In addition, W.R. Grace and Company has announced plans to have a 25 million pounds-per-year-plant in operation at Cornwall, Ontario. Part of the company's production was reported to be for captive use in the manufacture of plasticizers, but the company was expected to be in a position to sell a considerable part of its output. Reichhold Chemicals uses some of its output captively, while Dominion Tar produces for sale. Most of the consumption is in the Toronto and Montreal areas. With a market estimated at 24 million pounds, Reichhold Chemicals placed its capacity at 5 million pounds, and estimated that of Dominion Tar and Chemical at 13 million, leaving a short-fall of approximately the amount imported in 1960 and 1962. In addition, as noted below Dominion Tar exports phthalic anhydride. The shortage of capacity at that time was confirmed by the spokesman for Dominion Tar who noted that some of the company's naphthalene had been processed in the U.S.A. and the phthalic anhydride returned to Canada. In 1961, the company was, however, in the process of a substantial plant expansion.

The Canadian market of 24 million pounds in 1961 would have a commercial value of nearly \$4.3 million. About 70 per cent of the phthalic anhydride is used in the production of synthetic resins, principally alkyd resins, and most of the remainder is used to make plasticizers. Both of these uses have increased very appreciably since 1961. In 1963, just over 9 million pounds were imported, valued at \$883,000. In 1964, imports amounted to 15.5 million pounds valued at \$1.7 million.

Imports of Phthalic Anhydride,
1959-64

<u>Year</u>	<u>'000 lb.</u>	<u>\$'000</u>	<u>\$/lb.</u>
1959	7,248	972	.134
1960	7,660	1,428	.186
1961	12,609	2,240	.178
1962	7,254	767	.106
1963	9,257	883	.095
1964	15,582	1,703	.110

Source: D.B.S., Trade of Canada, Imports

Although, through the years imports have come from many countries, in 1963 and 1964 they originated almost entirely in France and the U.S.A.; in 1964, France supplied 8.6 million pounds, valued at \$877,000 and the U.S.A., 6.3 million pounds, valued at \$749,000. In 1964, all but 522,000 pounds of the imports entered duty-free.

The average value of imports in 1964, therefore, was about 11 cents per pound, somewhat higher than in 1963, but well below the published prices of earlier years, as contained in the table below. Dominion Tar and Chemical said, with respect to the situation in 1961, that:

"imports of phthalic anhydride represent roughly half of our present sales volume. If our production had been limited to the low level, represented by our share of the Canadian market, our unit cost of production would rise to the point where the whole operation would be uneconomical. We have managed to avoid this situation by operating at full capacity and exporting our surplus to the United Kingdom, where as a Commonwealth country we enjoy a substantial measure of duty protection."(1)

In 1961, the U.S.A. imported some 200,000 pounds of phthalic anhydride from Canada, valued at \$46,000; this decreased to about 60,900 pounds in 1962 with a value of \$9,678. Data for subsequent years are not published separately, nor are data on exports to the U.K.

There also were said to be substantial imports into Canada of phthalate esters as plasticizers.

The company maintained that the prices in European countries which export to Canada do not represent fair competitive conditions because of subsidies and other trade arrangements in those countries. Ocean freight rates also were said to favour inbound shipments. The brief noted, too, the instability of prices and supplies from these sources. Reichhold Chemicals said "the unrestricted imports from Japan, Italy and some other western European countries creates tremendous fluctuations in the price structure."(2) In 1964, more than half

(1) Transcript, Vol. 65, p. 9703

(2) Same, Vol. 65, p. 9739

the imports were from France and about 44 per cent from the U.S.A. A table of price comparisons was given to demonstrate the instability of prices of imports; at times, from 1963 to 1965, the published price in the U.S.A. has been as low as 8.5 cents and 9 cents per pound.

Price History, Phthalic Anhydride,
Selected Years, 1951-65

<u>Year</u>	<u>Domestic Price</u> - cents	<u>U.S. Price</u> per lb. -	<u>Imports</u>
1951	20 $\frac{1}{2}$	21 $\frac{1}{4}$	Up to 34
1953	18	20 $\frac{3}{4}$	14 - 17
1955	19	19 $\frac{1}{2}$	16 - 19
1958	15 $\frac{1}{4}$	21	13 $\frac{1}{2}$ - 14 $\frac{3}{4}$
1959	15 - 18	17 - 19	11 $\frac{3}{4}$ - 13 $\frac{1}{2}$
1960	18 - 21	17 - 23	16 $\frac{3}{4}$ - 21 $\frac{1}{2}$
1961	17 - 20	18 - 21	20 - 30
1963 (July)	12	11 $\frac{1}{2}$	9 $\frac{1}{2}$ (a)
1965 (Jan.)	13	11	11(a)

(a) Average annual value of imports, 1963 and 1964

Source: For the years 1951-61, Transcript, Vol. 65, p. 9704, 9705;
for the years 1963, 1965, Canadian Chemical Processing,
Oil, Paint and Drug Reporter, D.B.S., Trade of Canada, Imports

Phthalic anhydride is named in tariff item 923 which allows free entry into Canada when the product is imported by manufacturers of synthetic resins for use exclusively in the manufacture of synthetic resins, in their own factories. This use was said to account for most of the imports and Canadian production. When it is to be used for other purposes it may be entered under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N.

The Dominion Tar and Chemical Company Limited, in comparing tariff item 923 with item 921, pointed out that tariff item 921 provides free entry for material of a kind not produced in Canada to be used in the manufacture of synthetic resins and said that "Tariff item No. 921 thus obviates any requirements for item 923 in the circumstances of the original purposes for which tariff item No. 923 was introduced."(1)

One difference in the two tariff items is, of course, the restriction in item 921 to "not-made" materials. Dominion Tar noted that the antecedent to tariff item 923 had been introduced in 1934 when the listed materials also were not made in Canada. The company recommended rates of duty of 15 p.c., B.P. and 20 p.c., M.F.N. for phthalic anhydride, and expressed the opinion that the Canadian consumers would benefit from a more stable supply and price situation.

(1) Transcript, Vol. 65, p. 9700

The spokesman for Shawinigan Chemicals Limited, as a purchaser of phthalic anhydride, confirmed the desirability of having a domestic source of supply that is reliable in terms of price and quantity. These rates were considered to be necessary to safeguard Canadian producers against a possible recurrence of the import situation of the mid-1950's.

Reichhold Chemicals (Canada) Limited endorsed the submission by Dominion Tar and Chemicals, and drew attention to the fact that other materials (pentaerythritol, maleic anhydride, glycerin, soya fatty acids, propylene glycol and styrene) used as raw materials in the production of alkyd and polyester resins are now dutiable under tariff item 711 and said "We therefore consider that phthalic anhydride should fall entirely within the scope of tariff item No. 711."⁽¹⁾ This chemical was included in the list submitted by the Canadian Pharmaceutical Manufacturers Association for which, as noted below for other chemicals of the heading, an end-use proposal was made.

PLASTICIZERS OF HEADING 29.15

Plasticizers were divided into primary and secondary types; the primary type is highly soluble in the resin to be plasticized and may be used as the sole plasticizer, while the secondary type is relatively insoluble in the resin and is used, along with the primary plasticizer, to extend and cheapen the primary or to impart specific characteristics.

As described by the submission of Monsanto Canada Limited:

"the term 'plasticizer' covers a very broad range of chemicals (usually liquids or solids with relatively low melting points) which, when added to synthetic resins or cellulose derivatives, imparts such properties as toughness, permanent flexibility, tensile strength, adhesion, gloss, water resistance, fire resistance, oil resistance and electrical properties. In addition, plasticizers affect certain properties of the original polymer such as softening temperature permitting easier processing of the polymer into the end product desired."⁽²⁾

It is characteristic of their formulation that there can be many plasticizers which differ in but minor ways and are to a large extent interchangeable. It was suggested that such minor differences are prompted by the opportunity to import, free of duty, plasticizers not identical to those made in Canada even though the domestic products are equally acceptable in use. At the time of the hearing in 1961 there were reported to be four producers of plasticizers of the type classified by heading 29.15: Monsanto Canada Limited, Shawinigan Chemicals Limited, Howards and Sons (Canada) Limited and Canadian General Electric Limited. The first three presented submissions before the Board on plasticizers. Rohm and Haas Company of Canada Limited produces resinous plasticizers which are classified in B.T.N. Chapter 39.

⁽¹⁾ Transcript, Vol. 65, p. 9740

⁽²⁾ Same, Vol. 65, p. 9760

The market in Canada for plasticizers in 1961 was estimated at approximately 20 million pounds, increasing at about 7 per cent a year, and heavily concentrated in Ontario and Quebec. Imports of plasticizers were estimated at five or six million pounds per year, a high proportion of which was said to enter Canada duty-free. Total imports of all plasticizers, including rubber plasticizers identified in the import data for 1963 were valued at approximately \$4.3 million. It is not known what portion of these would be classified under B.T.N. heading 29.15, but imports of plasticizers derived from phthalic acid, most of which probably would be under heading 29.15, were valued at \$1.7 million in 1963; imports of blends or types not specifically identified amounted to \$760,000; some of these undoubtedly would be products classified by heading 29.15. Prices of phthalate-type plasticizers were reported to be about 25 cents a pound, and of some adipate plasticizers, about 40 cents a pound.

70 to 80 per cent of total plasticizer consumption was said to be in hot processing techniques of resin manufacture, mainly of polyvinyl chloride resins. It was observed by the spokesman for Shawinigan Chemicals that the plasticizer content of a typical vinyl compound is in the order of one-third of the whole composition. In addition, the preparation of surface coatings offers a substantial market.

The plasticizers are made in a batch process, frequently by reacting an alcohol with an acid, using a catalyst, to form an ester. Most raw materials are available from Canadian production, though some acids are not made in Canada and are imported.

Monsanto Canada Limited makes, at La Salle, Quebec, a range of primary plasticizers as esters of dibasic acids. The company reported that its annual capacity for plasticizers of all types was 12 million pounds. Those noted in the brief for heading 29.15 are as follows, (M) signifying those ruled made in Canada:

Phthalates

di-(2-ethylhexyl) (M)
 diisooctyl (M)
 diisodecyl (M)
 butyl 2-ethylhexyl
 butyl isooctyl
 butyl isodecyl
 di (n-octyl, n-decyl) (M)
 ditridecyl (M)

Adipates

di-(2-ethylhexyl) (M)
 diisooctyl (M)
 diisodecyl (M)
 di (n-octyl, n-decyl) (M)

Azelates

di-(2-ethylhexyl)
 diisooctyl

Maleates

dibutyl (M)

Fumarates

dibutyl (M)

Shawinigan Chemicals Limited, in its brief on plasticizers, listed 10 which it manufactures, in addition to mixtures of plasticizers. These are:

dibutyl phthalate (M)
 butyl 2-ethylhexyl phthalate
 di-2-ethylbutyl phthalate *
 di-2-ethylhexyl phthalate
 diisooctyl phthalate (M) *
 2-ethylhexyl n-decyl phthalate
 diisodecyl phthalate (M) *
 di-2-ethylhexyl adipate (M) *
 di-2-ethylhexyl azelate *
 di-2-ethylhexyl sebacate
 mixtures of plasticizers *

The six marked with an asterisk were also listed by Monsanto

Shawinigan Chemicals noted that the largest number of plasticizers for synthetic resins are classified by heading 29.15. The biggest use is in making elastomeric vinyl chloride compounds, in which, typically, as noted above, the plasticizer content may be in the order of one-third of the whole composition. The company listed a number of desirable characteristics in plasticizers, and divided the products into general purpose, having a good, all-round balance of properties, and plasticizers for particular applications where specific characteristics are stressed. Often a mixture of plasticizers is used. The company spokesman noted that the major plasticizers in heading 29.15 are made in Canada but that, although a number of the imported plasticizers might be of kinds not made in Canada, they compete directly with the plasticizers made in Canada. A spokesman for Howards and Sons noted that, in some instances, a plasticizer that was suitable for one purpose might be useless in another; in some instances, its use may be simply a matter of custom or cost.

Shawinigan Chemicals' production of plasticizers is divided almost equally between captive use and sale. All of the plasticizers are made in the same equipment by varying the raw material alcohols and acids and the catalysts. Most materials are available from the company's own production or from other Canadian sources. The company's plant began production in 1948.

The following plasticizers were listed by Howards and Sons (Canada) Limited, as products which it makes at Cornwall, Ontario. The five marked with an asterisk are also made by one or both of the other two producers from whom submissions were received. The products were said to be listed in approximate order of importance to the company.

The company began manufacture of plasticizers in Canada in 1953. The (M), as above, indicates a product ruled to be made in Canada.

dicyclohexyl phthalate (M)
 dimethylcyclohexyl phthalate (M)
 dibutyl phthalate (M) *
 di-iso-octyl phthalate (M) *
 di-iso-decyl phthalate (M) *
 di-iso-octyl adipate (M) *
 dibutyl sebacate (M)
 glycerol triacetate
 di-methoxy-ethyl phthalate (M)

Tariff Considerations

Many of the chemicals of interest to the companies making representations, when used as plasticizers, may be entered free of duty under tariff item 921; a few are entered under item 208t at rates of Free, B.P. and 20 p.c., M.F.N. When they are made in Canada, the appropriate tariff item is 711, with rates of 15 p.c., B.P. and 20 p.c., M.F.N. Plasticizer blends are dutiable under tariff item 220a(i) at rates of 15 p.c., B.P. and 20 p.c., M.F.N. Monsanto noted that "in practice, virtually all plasticizers are covered by tariff items 711 or 921."(1)

Monsanto recommended that:

"all ester plasticizers of Brussels heading No. 29.15 be considered of a class made in Canada and be dutiable at the heading rates of B.P. 15 per cent, M.F.N. 20 per cent ... We would further recommend that plasticizers falling in other Brussels headings, ... also be dutiable at rates B.P. 15 per cent, M.F.N. 20 per cent, unless a case is established for individual named products that such products are used in significant quantities, are not made in Canada, and are not competitive with products made in Canada."(2)

Similarly, Shawinigan Chemicals Limited recommended that all phthalates, adipates, azelates, sebacates, fumarates and maleates in heading 29.15 should be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N. The company also said that competitive plasticizers falling under heading 29.14 or other headings, including mixtures or non-chemically defined plasticizers of heading 38.19, should have the same rates of duty as those requested for products of heading 29.15.

The Howards and Sons brief suggested that the same rates of duty should apply:

(1) Transcript, Vol. 65, p. 9764

(2) Same, Vol. 65, p. 9765

"This company respectfully recommends that duty rates of 15 per cent -- 20 per cent -- 25 per cent be applied to the product enumerated in this brief. It further recommends that these rates of duty apply to all plasticizers coming within the scope of Brussels item No. 29.15 and specifically to all phthalic, adipic, sebacic, maleic and azealic esters. We also request that plasticizers, whether or not rendered chemically or physically different from the chemically defined plasticizers of chapter 29 by blending, admixture, dilution or other means be accorded the same tariff treatment when they fall under B.N. 38.19. In this way it is hoped that importers of plasticizers will be required to justify any entry at less than heading rates by standards which we believe the original 'class or kind' ruling was intended to secure."(1)

Among domestic producers, a principal cause for concern about import competition, therefore, was the substitutability among plasticizers. To a very large degree, one plasticizer was said to be as effective as many others for a specific purpose. This fact enables foreign manufacturers to make a product which differs in only minor respects from those made in Canada and to export it to Canada duty-free, as being of a kind not made in Canada. Hence the domestic manufacturers' requests for duty protection on plasticizers generally. As stated by Monsanto Canada Limited:

"Canadian producers are presently offering a wide range of plasticizers meeting the requirements of all major end uses. The major proportion of imports could readily be supplied by Canadian manufacturers, either in the form of the exact chemical or a functionally equivalent chemical."(2)

Similar views were expressed by Howards and Sons and by Shawinigan Chemicals. Pursuing the same thought, Howards and Sons' brief said:

"As we have stated ... some of the reasons given by importers for using particular imported plasticizers are of doubtful validity. We suggest that if plasticizers, or plasticizer blends bearing trade names, were subject to the same duty as plasticizers ... with recognizable names and structures, Canadian users might find that they could, after all, replace the blended or adulterated or diluted imports with domestic manufactured products ... It is our contention that the requirements for most of these imported plasticizers could be filled by Canadian-made plasticizers."(3)

In commenting further on this matter with respect to the proposed rates of duty, the spokesman for Howards and Sons observed that "a duty of 20 per cent on imports from M.F.N. countries would provide a sufficient margin between our costs and the duty-paid selling prices to enable us to sell in our own market at a margin of profit which would provide a satisfactory return on investment and the means for

(1) Transcript, Vol. 65, p. 9862

(2) Same, Vol. 65, p. 9765

(3) Same, Vol. 65, p. 9861

research and future development. Without protection this cannot be done."(1)

Shawinigan Chemicals did not consider that the proposed rates should be defended as an arithmetically precise level of the protection needed at a particular time, but as a level of protection under which chemical production in Canada could generally withstand import competition.

The Rubber Association of Canada expressed an interest in the following plasticizers for use in the manufacture of synthetic resin products for the rubber industry; the (M) and asterisk have the same meaning as in the previous listings:

benzyl butyl phthalate
dibutyl sebacate (M) *
dinonyl phthalate

For the above three chemicals, the Rubber Association of Canada proposed that free entry be continued under both B.P. and M.F.N. Tariffs when the chemicals are for use in the manufacture of synthetic resin products and as long as they are of a kind not made in Canada.(2) A spokesman for the Industry Committee noted that the Rubber Association had not claimed that the plasticizers could not be replaced by any materials that were made in Canada, or were uncompetitive with Canadian-made plasticizers.

OTHER PRODUCTS OF HEADING 29.15

Naugatuck Chemicals Division of Dominion Rubber Company, included phthalic anhydride in a list of five chemicals in which it is interested as a consumer. The company said:

"We take no issue with the rates which are being proposed to you by the producers of these materials, provided the Board also recommends those rates which will be proposed to you for the products which we manufacture."(3)

The other chemicals of this heading mentioned by the company in this respect were:

di-2-ethylhexyl maleate
maleic anhydride
tetrachlorophthalic anhydride
fumaric acid

Two chemicals on this list, maleic anhydride and fumaric acid were the subject of a submission by Monsanto Canada Limited, which also included maleic acid. Monsanto makes all three chemicals in Canada although the maleic acid is produced only as an intermediate in the manufacture of maleic anhydride and is not marketed. At the time of the hearing in 1961 these were new products to the company.

(1) Transcript, Vol. 65, p. 9862

(2) Same, Vol. 65, p. 9875

(3) Same, Vol. 64, p. 9525

The company said that it had sufficient capacity to meet the Canadian demand for maleic anhydride and that, while it had facilities for making fumaric acid, they were not at that time adequate for the demand. The brief noted, too, that in the United States installed capacity is much in excess of demand.

Competition was said to come from imports from several foreign countries. In 1963, imports of fumaric acid amounted to about 2.1 million pounds, valued at some \$281,000 and in 1964, about 2.5 million pounds valued at \$306,000. Data on the other chemicals are not available.

These products, to a great extent interchangeable, are used in the manufacture of polyester and alkyd resins, in paper size, and in agricultural chemicals.

Although maleic anhydride and fumaric acid are both made in Canada, only the former enjoys a made-in-Canada status in the Tariff. When maleic anhydride is used to make chemicals to control fungi, weeds, insects, rodents or other plant or animal pests it may be entered into Canada free of duty under all Tariffs under tariff item 791; when for other uses it may be entered under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. Fumaric acid may also be entered free of duty under item 791 or free under item 921 when for use in making synthetic resins; more generally it may be entered under tariff item 216 at rates of Free, B.P. and 15 p.c., M.F.N. The same tariff items apply to maleic acid but this may also be entered duty-free under tariff item 923, as an enumerated article, when for use in making synthetic resins.

Howards and Sons (Canada) Limited requested duty-free entry for sebacic acid until it is made in Canada. The company uses the acid in the manufacture of plasticizers.⁽¹⁾

Pfizer Company Limited listed the following chemicals in which the company has an interest as a potential producer:

ammonium oxalate
ferric potassium oxalate
ferric sodium oxalate

These chemicals are currently imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. The company's recommendation said:

"We have no objection to exceptions on these items, provided that the exception is appropriately qualified so that the heading rates will apply if and when we manufacture."⁽²⁾

Another chemical in which Pfizer Company expressed interest is oxalic acid; the company, the only manufacturer in Canada at the time of the hearing, has its plant at Cornwall, Ontario, where oxalic acid was recovered from a raw material imported from the parent corporation in the U.S.A. It is a powerful organic acid used in metal clean-

(1) Transcript, Vol. 65, p. 9863

(2) Same, Vol. 63, p. 9490

ing compositions (removing rust and scale from internal combustion engines) and used also for bleaching wood and leather. The Canadian market at the time of the hearing was said to be for approximately 1.2 million pounds annually, of which most is supplied by imports. In 1963, imports amounted to 1.08 million pounds, valued at \$150,000. Oxalic acid is named in tariff item 208q, under which it may be imported at rates of Free, B.P. and $7\frac{1}{2}$ p.c., M.F.N. The company, in recommending rates of 15 p.c., B.P. and 20 p.c., M.F.N. said:

"Our experience with oxalic acid is evidence of the need for rates of 15% B.P. and 20% M.F.N. on chemicals made in Canada and highlights the need to eliminate tariff items which provide for admission of chemicals at rates below the 15 - 20 level without qualification as to 'made in Canada' status." (1)

The Board has since been advised that the company no longer makes oxalic acid in Canada, and the company requested that its brief be withdrawn.

Submissions were made by W.J. Bush and Company Limited and W.J. Bush and Company (Canada) Limited concerning succinic acid, dibenzyl succinate, diethyl succinate and calcium succinate. These chemicals were reported to be not made in Canada, but were imported from the U.K. Succinic acid is imported under tariff item 216 and the others under item 208t; both of these items carry rates of Free, B.P. and 15 p.c., M.F.N. The companies recommended that these rates should be continued until the chemicals are made in Canada, at which time rates of 15 p.c., B.P. and 20 p.c., M.F.N. should apply.

Canadian Titanium Pigments Limited submitted a brief to the Board covering dibasic lead stearate and dibasic lead phthalate; the former was dealt with under B.T.N. heading 29.14 and the company said that, while most of its brief was written with reference to dibasic lead stearate, the comments apply equally to other stabilizers, specifically to dibasic lead phthalate. (2) Dibasic lead phthalate is now ruled made in Canada and is dutiable under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. These rates were recommended by the company.

Canadian Industries Limited submitted a brief on dimethyl terephthalate which is used in the manufacture of a polyester resin, polyethylene terephthalate, which, in turn, is used to make a filament yarn known as terylene. Dimethyl terephthalate is not made in Canada; it is imported from the U.S.A. by the only user, C.I.L. Although it is made in Britain, the unavailability of supplies and the economics of obtaining the product from the U.K. were said to prohibit its importation from that source. It is imported free of duty under tariff item 921, and the company requested that free entry be continued until such time as the product is made in Canada, noting that terylene must compete in use with cotton and wool which may be entered into Canada free of duty, and that imposition of the heading rates of 15 p.c., B.P., 20 p.c., M.F.N., proposed by the Industry Committee, would impose a very significant additional cost on the manufacture of terylene.

(1) Transcript, Vol. 63, p. 9470

(2) Same, Vol. 65, p. 9745

Lubrizol of Canada Limited made a submission under this heading on a "high molecular weight organic acid" which is currently imported under tariff item 220e at rates of Free, B.P. and 5 p.c., M.F.N. The nature of the acid was not made apparent, nor were any data presented.⁽¹⁾ The tariff item is concerned with materials, of a class or kind not made in Canada, for use in the manufacture of additives for heating, lubricating and fuel oils. The suggestion was made at the hearing that the product might more properly be classified as an oil additive under B.T.N. heading 38.14, under which heading the company proposed rates of 15 p.c., B.P., 20 p.c., M.F.N. for the additives which are made in Canada. This proposal is dealt with under that heading.

At the hearing on pesticides, in November 1962, a group of seven manufacturers of pesticides made a proposal concerning a list of biologically active materials, among which were dimethyl phthalate and pyrethrin II, for use in the manufacture of pesticide formulations. The companies were:

A.H. Howard Chemical Co. Ltd.	Orangeville, Ontario
Allied Chemical Services Ltd.	Calgary, Alberta
Chipman Chemicals Ltd.	Hamilton, Ontario
Gallowhur Chemicals Canada Ltd.	Lachine, Quebec
Manchester Products Ltd.	Galt, Ontario
Niagara Brand Chemicals	Burlington, Ontario
Green Cross Division	
Sherwin Williams Co. of	
Canada Ltd.	Montreal, Quebec

The companies proposed:

"The signatories of this brief share the view of the Chemical Industry Committee that, when a biologically active chemical, now on Appendix II, is made in Canada, it should become subject to the duty rates which have been recommended for the appropriate B.T.N. heading."⁽²⁾

The proposal was based on the belief that a duty on biologically active materials, not made in Canada, would increase the prices of pesticides to Canadian users without producing off-setting advantages for any segment of industry.

The Canadian Pharmaceutical Manufacturers Association submitted to the Board the following list of chemicals used by its members in the manufacture of pharmaceutical products and recommended that some end-use treatment be adopted for these chemicals. The Association recommended that rates of Free, B.P. and 15 p.c., M.F.N., apply when the chemicals are not made in Canada, unless otherwise provided for, and that the heading rates proposed by the Industry Committee (15 p.c., B.P. and 20 p.c., M.F.N.) apply when they are made in Canada. The chemicals in the present heading to which this proposal applies, the more important marked with an asterisk, are:

⁽¹⁾ Transcript, Vol. 65, p. 9876

⁽²⁾ Same, Vol. 108, p. 16332-3

adipic acid
ammonium oxalate
diethyl ethylmalonate
diethyl oxalate
diethyl phthalate
diisobutyl phthalate
ferrous fumarate *
maleic acid
maleic anhydride
sodium oxalate
succinic acid
succinic anhydride
phthalic anhydride
potassium oxalate

Fine Chemicals of Canada Limited proposed that end-use items 875a and 880p be combined and the wording and sense enlarged to eliminate the restriction to use in the manufacture of specific antibiotics. The combined item would allow the duty-free entry of any chemical reagent or raw material, not made in Canada, used in the manufacture of an antibiotic for human or animal medicine. This proposal applied to succinic anhydride, said to be not made in Canada but imported by the company for use in making chloramphenicol, an antibiotic.⁽¹⁾

(1) Transcript, Vol. 79, p. 12112

ALCOHOL-ACIDS, ALDEHYDE-ACIDS, KETONE-ACIDS, PHENOL-ACIDS AND OTHER SINGLE OR COMPLEX OXYGEN-FUNCTION ACIDS, AND THEIR ANHYDRIDES, ACID HALIDES, ACID PEROXIDES AND PERACIDS, AND THEIR HALOGENATED, SULPHONATED, NITRATED OR NITROSATED DERIVATIVES - B.T.N. 29.16

This heading refers to carboxylic acids which contain one or more of the relevant oxygen functions. The heading is divided, in the Explanatory Notes to the Brussels Nomenclature, into four sub-groups as follows:-

- (A) ALCOHOL-ACIDS, ACYCLIC AND CYCLIC: these contain both the alcohol function and the acid function, each of which may react according to its own nature, the alcohol giving ethers and other derivatives and the acid giving salts, esters, etc. This group includes such acids as lactic, malic, tartaric, citric, gluconic and phenylglycollic.
- (B) ALDEHYDE-ACIDS, KETONE-ACIDS: the aldehyde acids contain both the aldehyde group and the acid group while the ketone-acids contain both the ketone group and the acid group.
- (C) PHENOL-ACIDS: these are cyclic (aromatic) acids which contain both the acid group and one or more groups (OH) in the nucleus.
- (D) OTHER SINGLE OR COMPLEX OXYGEN-FUNCTION ACIDS: this group includes anisic acid and piperonylic acid.

Most of the chemicals brought to the attention of the Board under this heading are used in making pharmaceutical products, many having, in addition, uses in foods; a few are used in making herbicides.

In 1962, the value of shipments of this group of chemicals was just over \$4.5 million, less than three per cent of the value of shipments for the chapter as a whole.

In its introductory statement, the Industry Committee noted that all chemicals currently of commercial significance had been dealt with in the submissions which the Board had received, and that any other chemicals within the heading should be dutiable at the general rates proposed, 15 p.c., B.P. and 20 p.c., M.F.N.

Lactic Acid

Bowmans Chemicals Limited and W.J. Bush and Company (Canada) Limited submitted proposals concerning lactic acid. This chemical, not made in Canada, is used as an acidulant in food such as pickles and jams, as a water conditioner in the brewing industry, in leather tanning and in cellulose film manufacture. In 1963, about 545,000 pounds, valued at some \$142,000, were imported; in 1964, imports amounted to 673,000 pounds, valued at \$178,000. Over the years, most imports have come from the United Kingdom; other major sources of supply are Holland and the U.S.A. Over 90 per cent of the market was said to be in Ontario and Quebec.

Lactic acid currently may be imported under tariff item 216 at rates of Free, B.P. and 15 p.c., M.F.N. Bowmans Chemicals Limited requested that "existing rates of duty and of British Preference should be retained for lactic acid..."⁽¹⁾ These rates should be applicable until the product is made in Canada. Similarly, W.J. Bush and Company (Canada) Limited proposed that the existing rates of duty on lactic acid should apply until it is made in Canada, at which time rates of 15 p.c., B.P. and 20 p.c., M.F.N. would be appropriate. As noted below, lactic acid was included as one of the more important chemicals in a list submitted by the Canadian Pharmaceutical Manufacturers Association; the rate proposals were the same as those of the companies already mentioned.

Citric Acid

Citric acid is made in Canada by Sturge (Canada) Limited and by the Kemball Bishop Division of Pfizer Canada Limited. Although it occurs widely in nature, particularly in citrus fruits, the bulk of the citric acid now used is obtained by fermenting sugar by-products with special strains of bacilli. In Canada it is made from imported calcium citrate, an intermediate which apparently cannot economically be manufactured in Canada. The process involves acidifying calcium citrate with sulphuric acid, concentrating the liquor and crystallizing the acid crystals. Production of citric acid began in Canada in 1953. It is widely used in the food, beverage and pharmaceutical industries. It has, in addition, industrial uses in making alkyd resins, lacquers and adhesives as well as in cleaning and pickling metals and in the decontamination of atomic waste. Other acids are substitutable in some uses, but are generally higher in price.

In March 1965, the published price of citric acid in the United States was 29½ cents per pound; no Canadian price was published. However, at the time of the hearing in October, 1961, the Canadian price was said to vary from 27 cents per pound delivered in Ontario and Quebec to 31 cents per pound in Saskatchewan, f.o.b. Regina and Saskatoon.⁽²⁾ The price at that time was said to have been reduced because of the threat of low-priced imports. The price of 26 cents per pound for truck load lots, in 1961, was lower than that reported for the U.S.A. (28 cents), one cent higher than that reported for the U.K. The spokesman for one company said that he was under the impression that citric acid was being offered from Belgium as low as 18 cents per pound, and it was the possibility of imports from that country which was the company's principal concern. There was no particular concern, at the time of the hearing, over potential imports from British preferential sources. Consumers in Ontario apparently use about 70 per cent of all citric acid used in Canada. Quebec is next with about 20 per cent and the balance is distributed throughout the other provinces.

Import and export data are not available, and data on production in Canada are not available in public form. At the public hearing a spokesman for one of the producers suggested that Canadian consumption would be less than ten million pounds; the consumption accounted

⁽¹⁾ Transcript, Vol. 66, p. 9890

⁽²⁾ Same, Vol. 66, p. 9900

for in published data is well below this amount, being about 3 million pounds in 1962 and 3.5 million pounds in 1963. Thus, the value of citric acid used probably is less than \$2 million. There are exports of citric acid, though they are small in relation to Canadian consumption. The spokesman for Pfizer Canada Limited said imports were small because of lower Canadian prices and the provision of customer service:

"Hitherto our prices in relation to the landed prices of foreign material have effectively prevented significant imports. The probability of several new citric acid plants being built in various parts of the world, however, has resulted in a large European exporter of the material drastically reducing his prices. We believe this move is designed to head-off excessive expansion. It does, nonetheless, place the severest strain on our operations."(1)

And added:

"we provide acid to their [the customers] particular specifications; ... There is short delivery and there isn't the same necessity for carrying stocks."(2)

Citric acid currently is imported into Canada under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. Both manufacturers requested rates of 20 p.c., B.P. and 25 p.c., M.F.N. In support of these rates, Pfizer said:

"It is our belief that an additional 5 per cent tariff M.F.N. will enable the company to carry on through the present depressed price situation, offering an assured domestic source of this important chemical to Canadian users."(3)

Sturge, in recommending the same rates, noted that a one-time world shortage had become a surplus and additional protection of the Canadian market is necessary.

As noted below in greater detail, citric acid is on the list of chemicals used by the members of the Canadian Pharmaceutical Manufacturers Association, for which some end-use consideration was requested.

Calcium Citrate

Calcium citrate is not made in Canada; it is, however, used in Canada in making citric acid. It has no other known use. The Canadian manufacturers of citric acid import most of their supplies from the United Kingdom. The currently applicable tariff item is 208t, with rates of Free, B.P. and 15 p.c., M.F.N. Both importers proposed that these rates should remain unchanged until the chemical is made in Canada, at which time rates of 15 p.c., B.P. and 20 p.c., M.F.N. should apply. Monocalcium citrate in a water slurry for use in the manufacture of citric acid and its salts may be entered free of duty under tempor-

(1) Transcript, Vol. 66, p. 9925

(2) Same, Vol. 66, p. 9934

(3) Same, Vol. 66, p. 9926

ary item 216f. The possibility of Canadian production from sugar by-products was noted at the public hearing. As noted below in greater detail, calcium citrate is on the list of chemicals used by the members of the Canadian Pharmaceutical Manufacturers Association and for which the Association requested end-use consideration.

Sodium Citrate

Sodium citrate is made in Canada by Sturge (Canada) Limited and Pfizer Canada Limited; the capacity of these two plants was said to be in excess of Canadian demand. It is used as an emulsifier in processed cheese and in ice cream, in carbonated beverages and in pharmaceuticals. It finds an application, also, as an anti-coagulant in blood transfusions and in plasma processing. Imports and exports are small; imports in 1963, mostly from the U.K., amounted to about 2,000 pounds, valued at \$1,000. Sodium citrate is currently imported under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. As an anti-coagulant, sodium citrate might be entered duty-free under tariff item 206c(2). Both companies recommended that the rates of duty should remain unchanged from their current level, it being noted by Sturge that domestic production is "not threatened by foreign competition."(1)

Sturge (Canada) Limited included sodium citrate dibasic in its remarks on sodium citrate. Similarly, Pfizer Canada Limited included potassium citrate in its brief on sodium citrate. The company said that potassium citrate is used almost exclusively in making pharmaceuticals and foods. Imports are "very small."(2) It is entered into Canada under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. and Pfizer recommended that these rates be left unchanged, saying: "There would appear, therefore, to be no case for disturbing the existing duties applicable to these chemicals and we are not aware of any request to do so."(3)

As noted below, tripotassium citrate and trisodium citrate are on the list of chemicals used by the members of the Canadian Pharmaceutical Manufacturers Association, for which some end-use consideration was requested.

Other Chemicals of Heading 29.16

Pfizer Canada Limited submitted a brief on a number of chemicals which the company imports for resale and for its own use. They are not made in Canada, although Pfizer said that it might manufacture some of them at some time in the future. When they are made in this country, the company suggested that they be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N., but until that time the company proposed that rates of Free, B.P. and 15 p.c., M.F.N. should apply. Generally, rates of Free, B.P. and 15 p.c., M.F.N. currently are applicable to these chemicals under tariff item 208t. However, tartaric acid crystals

(1) Transcript, Vol. 66, p. 9894

(2) Same, Vol. 66, p. 9957

(3) Same, Vol. 66, p. 9958

and cream of tartar in crystals are dutiable under tariff item 2080 at rates of Free, B.P. and 10 p.c., M.F.N. The chemicals mentioned in Pfizer's proposal are:

ammonium gluconate
calcium gluconate
ferrous gluconate
magnesium gluconate
manganese gluconate
potassium gluconate
sodium gluconate
tartaric acid
potassium bitartrate (cream of tartar)
potassium sodium tartrate (Rochelle salts)

As noted below, calcium, ferrous, and sodium gluconates, as well as tartaric acid and potassium sodium tartrate, are on the list of chemicals used by the members of the Canadian Pharmaceutical Manufacturers Association and for which the Association requested some end-use consideration.

Imports of sodium gluconate, in 1963, were valued at \$220,000; imports of tartaric acid, in 1964, amounted to approximately 609,000 pounds, valued at nearly \$169,000 and of sodium bitartrate, in 1964, to 379,000 pounds, valued at \$171,000.

Fine Chemicals of Canada Limited proposed that end-use items 875a and 880p be combined and the wording and sense enlarged to eliminate the restriction to use in the manufacture of specific antibiotics. The combined item would allow the duty free entry of any chemical reagent or raw material, not made in Canada, used in the manufacture of an antibiotic for human or animal medicine. This proposal applied to tartaric acid, mentioned above, which the company imports for use in making chloramphenicol, an antibiotic.⁽¹⁾

Naugatuck Chemicals Division of Dominion Rubber Company Limited presented briefs on a number of agricultural chemicals used in the control of weeds and classified by heading 29.16. These included 2,4-dichlorophenoxyacetic acid (2,4-D) and its mixed butyl and iso-octyl esters. The derivatives of 2,4-D are used as herbicides for the control of broad-leaved weeds in cereal crops and pastures; in this use, the area of greatest consumption is in the prairie provinces. It is also used to control weeds on lawns, golf courses and roadsides. Naugatuck was reported to be the only manufacturer in Canada of these chemicals, which are the raw materials for the formulators of the weed killers. The esters were said to be particularly valuable as herbicides because of their storage stability under freezing conditions.

Naugatuck noted that, at the time of the hearing in October 1961, the price of the mixed butyl ester of 2,4-D was lower in Canada than in the United States, quoting prices of \$0.345 per pound in tank car quantities in Canada and \$0.42 per pound in the U.S.A., though lower prices are likely available in the U.S.A. for large-volume contract purchases. The company said: "Prices to Canadian farmers have

(1) Transcript, Vol. 79, p. 12112

always been competitive with U.S. prices and often 10 per cent less."⁽¹⁾ Early in 1965, the published Canadian price was 36½ cents per pound, while that in the U.S.A. was 35½ cents.

The use of herbicides made from these products was said to have increased from 2.19 million pounds of 2,4-D acid equivalent in 1948 to 6.13 million pounds in 1960. Naugatuck said that it "has ample capacity in its two plants at Edmonton and Elmira to produce more than the present Canadian requirements for 2,4-D type herbicides."⁽²⁾ Some of the herbicides used in Canada are imported from the United States; these were said to have amounted to about 4 million pounds in 1960, valued at about \$2 million. In 1963, imports of weed-killing preparations or chemicals, 2,4-D and others, were valued at some \$6 million. In 1964, imports of 2,4-D acid were reported separately at 933,000 pounds, valued at \$287,600. Naugatuck Chemicals noted that products based on 2,4-D had been exported by formulators and said that, "There is every indication that the volume of such sales will increase."⁽³⁾

These chemicals may be imported under tariff item 219a(i) when in packages not exceeding three pounds gross weight, at rates of Free, B.P. and 12½ p.c., M.F.N., or, in larger quantities, duty-free under tariff item 219a(ii), or free of duty under item 791 when imported as materials for use in making herbicides.

Naugatuck proposed that rates of 15 p.c., B.P. and 20 p.c., M.F.N. should apply to imports of 2,4-D acid and on mixed butyl and iso-octyl esters. In support of this proposal, the company said:

"As we have stated previously, we could not maintain our position as a manufacturer of chemicals in Canada if placed under a competitive disadvantage caused by higher duty rates on raw materials, unless we receive commensurate protection for the products which we make."⁽⁴⁾

The same company submitted a brief on a similar chemical, 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) and its mixed butyl and iso-octyl esters, of which it is the only Canadian manufacturer. In addition to killing weeds, these chemicals destroy small trees and brush; they usually are applied as a mixture with 2,4-D often beside railroads and highways to keep the area free from growth. Naugatuck said that the price of the iso-octyl ester of 2,4,5-T in tank truck lots to Canadian formulators, at the time of the hearing, was about 80 cents per pound while the corresponding price in the U.S.A. was about \$1.02 per pound and the spokesman noted that "Prices to Canadian industrial users are consistently competitive and often 20 per cent lower than in U.S.A."⁽⁵⁾ No Canadian prices are published, but Naugatuck indicated that the price of the ester was about 85 or 90 cents a pound; in June 1965, the published price in the U.S.A. for 2,4,5-T in drums, car load lots, was 95 cents per pound at works; for the iso-propyl ester the published price was \$1.24 per pound. Sales of 2,4,5-T products by herbicide formulators have been generally about 300,000 to 600,000 pounds a year, on an acid

(1) Transcript, Vol. 66, p. 9973

(2) Same, Vol. 66, p. 9977

(3) Same, Vol. 66, p. 9978

(4) Same, Vol. 66, p. 9979

(5) Same, Vol. 66, p. 9998

equivalent basis. Import data are included in the four million pounds of products noted under 2,4-D; there have been exports of products incorporating 2,4,5-T, and these were expected to increase.

The current rates of duty and the company's proposal and arguments were the same for 2,4,5-T as for 2,4-D.

Naugatuck Chemicals also submitted a proposal on 2-methyl-4-chlorophenoxyacetic acid (MCP acid) and mixed butyl ester. MCP is usually applied as the mixed butyl ester or amine salt formulation for the control of weeds in oats, flax and on some pastureland; the derivatives have a milder action than those from 2,4-D. Sales of MCP products by formulators were reported to have been approximately 770,000 pounds, MCP acid equivalent, in 1960. Published data on sales of MCP acid herbicides in 1964 were 1.7 million pounds, valued at \$1.8 million. The price of MCP ester was reported at the hearing to be about 55 cents a pound, intermediate between that for 2,4-D and that for 2,4,5-T. The prices of MCP derivatives were said to be lower in Canada than in the U.S.A.

MCP acid was not made in Canada at the time of the hearing; it is imported, usually from the U.K. or from Europe. The esters are made here by mixing the acid with the appropriate alcohol, in the presence of an acid catalyst.

Like 2,4-D and 2,4,5-T, MCP may be entered duty-free under tariff item 791 or 219a for use in pesticides. More generally, the acid may be imported under tariff item 216 at rates of Free, B.P., 15 p.c., M.F.N.; the esters are dutiable at the same rates under tariff item 208t. The company proposed rates of 15 p.c., B.P. and 20 p.c., M.F.N. for MCP and its derivatives for the same reasons as those advanced for the other herbicides. At the time of the hearing in 1961, Naugatuck Chemicals expected to be making MCP acid in Canada in the near future, but the Board has no information that production had begun by 1964.

The Board heard two proposals concerning 3-hydroxy-2-naphthoic acid, also known as 2-hydroxy-3-naphthoic acid and as beta oxynaphthoic acid, as well as by a number of trade names. The chemical is used by the pigment industry in producing coloured pigments and by the textile industry for fixing dyes. Not made in Canada, it is imported from West Germany, the U.K. and the U.S.A. Consumption by the manufacturers of pigment dyestuffs, at the time of the hearing, was estimated to be about 25,000 pounds, valued at \$18,000. The Canadian Color Makers Association and the Primary Textiles Institute submitted briefs on this chemical, proposing that it should be free of duty until it is made in Canada, at which time it should be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N. It is now entered free of duty under tariff item 203f when for use in the manufacture of coal tar dyes; its use in the manufacture of coloured pigments permits its entry under this item. No satisfactory substitutes were said to exist either in the pigment or textile use. The Color Makers Association, in requesting the continuation of free entry, suggested that the free rates should be applied "under the provisions of an end-use item."⁽¹⁾ The spokesman for the Association, however, noted that when the chemical is made in Canada the heading

(1) Transcript, Vol. 66, p. 10032

rates of 15 p.c., B.P. and 20 p.c., M.F.N. should apply. The proposal by the Primary Textiles Institute was not confined to an end-use item.

Three proposals came before the Board concerning acetylsalicylic acid, a pharmaceutical chemical widely used in the preparation of pain-killing drugs. Not made in Canada, it is imported principally from the United Kingdom, but also from the United States and France. In 1963, imports of 1,549,000 pounds were valued at \$912,000; in 1964, there were nearly 2 million pounds imported, with a value of nearly \$900,000, or about 48.5 cents a pound. More than 60 per cent of the imports were from the U.K.; most of the balance was from the U.S.A. It is currently entered under tariff item 216 at rates of Free, B.P. and 15 p.c., M.F.N. All of the companies that made presentations, Charles E. Frosst and Company, John Wyeth and Brother (Canada) Limited and W.J. Bush and Company (Canada) Limited, proposed that acetylsalicylic acid should continue to be dutiable under the rates that currently apply, at least while not made in Canada. In support, Charles E. Frosst noted the very wide use of drugs made from the chemical and pointed out that, if rates of 15 p.c., B.P. and 20 p.c., M.F.N. were adopted, "the increased duty alone will add almost 15 per cent or \$70,000 to the import value of A.S.A. The final cost to the consumer will be greatly in excess of this amount by reason of the costs and mark-ups at the various levels of distribution and processing."⁽¹⁾ The company also suggested that there seemed to be no reason to change the existing margin of preference.

In addition to acetylsalicylic acid, John Wyeth and Brother (Canada) Limited listed eight chemicals in which it was interested as an importer. These are listed below; concerning them, the company said:

"There being no Canadian manufacture of these chemicals, an increase in duty rates would serve only to increase the costs and selling prices of those Canadian industries who must use these chemicals in their Canadian operations.

"We submit that there should be no increase until such time as a substantial portion of Canadian requirements is available from Canadian production."⁽²⁾

All of these chemicals are understood to be imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. with the exception of acetylsalicylic acid entered under tariff item 216. Methyl salicylate may be entered as an essential oil under tariff item 264a at rates of Free, B.P. and $7\frac{1}{2}$ p.c., M.F.N. The spokesman for the Industry Committee noted that the second product on the list, acetylsalicylic acid with 10% starch granulation is a mixture used as a medicament and therefore, in the B.T.N., is properly classified under heading 30.03. It may be entered under tariff item 220(i) of the Canadian Customs Tariff at rates of $17\frac{1}{2}$ p.c., B.P., 20 p.c., M.F.N. The chemicals listed by John Wyeth were:

(1) Transcript, Vol. 66, p. 10056

(2) Same, Vol. 66, p. 10058

acetylsalicylic acid
 acetylsalicylic acid with 10% starch granulation
 dioctyl sodium sulfosuccinate
 cyclandelate
 glycol monosalicylate
 methyl salicylate
 methyl p-hydroxybenzoate
 n butyl p-hydroxybenzoate
 propyl p-hydroxybenzoate

A number of the chemicals in this list were of interest to W.J. Bush and Company (Canada) Limited and W.J. Bush and Company Limited, of England. The chemicals in which these companies are concerned are noted below. None is made in Canada and W.J. Bush claimed to be capable of meeting Canadian demand from its production in the U.K. One of the group, ethyl methyl phenyl glycidate, is used in flavouring; the others have pharmaceutical applications. Acetylsalicylic acid and lactic acid have been discussed above; mandelic acid and salicylic acid are imported into Canada under tariff item 216 at rates of Free, B.P. and 15 p.c., M.F.N. The remaining chemicals on the lists are dutiable at the same rates under tariff item 208t. The companies requested that these rates should be continued until such time as the products are made in Canada, at which time they be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N.

Amyl salicylate, benzyl salicylate, ethyl salicylate, methyl salicylate and possibly ethyl methyl phenyl glycidate, in the following list, might also be entered as essential oils under tariff item 264a, at rates of Free, B.P., $7\frac{1}{2}$ p.c., M.F.N.; this item is not part of Reference 120. Imports of salicylates were reported to be \$50,000 in 1963.

The chemicals listed by W.J. Bush and Company (Canada) Limited are:

acetylsalicylic acid
 amyl salicylate
 benzyl salicylate
 butyl p-hydroxybenzoate
 ethyl p-hydroxybenzoate
 methyl p-hydroxybenzoate
 propyl p-hydroxybenzoate
 lactic acid
 mandelic acid
 calcium mandelate
 salicylic acid
 ethyl methyl phenyl glycidate

Those listed by W.J. Bush and Company Limited are as follows:

ethyl salicylate
 methyl salicylate
 sodium salicylate
 dibenzyl succinate
 benzyl sodium succinate
 mandelates

The spokesman for the Industry Committee noted that the term "mandelates" is "too general a term for the basis of an exception, and that if any exceptions for esters or salts of mandelate acid is to be created, they should be more specifically named." (1)

Hoffman-La Roche Limited submitted a proposal for diacetone-ketogulonic acid (DAG), which is not made in Canada but is imported for use in making synthetic Vitamin "C", otherwise known as ascorbic acid; the company was the only known importer. There is no other use for it and no substitute, and this company is the only Canadian producer of Vitamin "C". No data on production, imports or prices of Vitamin "C" are publicly available; there were said to be no exports. Competition from foreign producers of Vitamin "C" was said to be a factor with which the company had to contend. This chemical may be imported under tariff item 216 at rates of Free, B.P. and 15 p.c., M.F.N., or under item 216d, free of duty when for the manufacture of ascorbic acid. Hoffman-La Roche proposed that it should be free of duty until it is made in Canada, at which time it should be subject to rates of 15 p.c., B.P. and 20 p.c., M.F.N.

Canada Packers Limited expressed interest in a number of chemicals derived from the bile of cattle and hogs available from their slaughter-house operations. The chemicals manufactured from it are known as bile acids. The main bile acids derived from cattle are cholic acid and desoxycholic acid and from hog bile, hyodesoxycholic acid. They, in turn, are used as intermediates in manufacturing pharmaceuticals such as cortisone and similar steroids as well as proprietary medicines. Canada Packers is the sole manufacturer of bile acids in this country. There is some import competition from the United States, but imports were said to be not of serious concern. The company's sales, in 1961, were at an annual rate of about \$160,000. The company exports something less than 40 per cent of its production of dehydrocholic acid; a much larger portion of the cholic and desoxycholic acids are exported. (2) Two of the chemicals, dehydrocholic acid and desoxycholic acid, are dutiable under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N., while the others are dutiable under item 216 at rates of Free, B.P. and 15 p.c., M.F.N. The company recommended rates of 15 p.c., B.P. and 20 p.c., M.F.N. because costs of production in the U.S.A. were said to be lower than in Canada.

Two other tariff items have some relevance to bile acids. Tariff item 206e provides duty-free entry for animal bile for use in the manufacture of bile acids, and item 863 provides duty-free entry for chemicals for use in the manufacture of steroid derivatives. Bile acids might be imported under this item, but neither Canada Packers nor any other company expressed an interest in either item with respect to bile acids. Item 206e is not part of Reference 120.

The chemicals of interest to Canada Packers under this heading are as follows:

(1) Transcript, Vol. 66, p. 10062

(2) Same, Vol. 66, p. 10080

cholic acid
 dehydrocholic acid
 desoxycholic acid
 hyodesoxycholic acid
 hyocholic acid
 3B hydroxy-A5-cholamic acid

The Canadian Pharmaceutical Manufacturers Association submitted a brief on a number of chemicals which its members either manufacture or use as raw materials. The Association's brief said:

"The Association is basically in agreement with the Industry Committee on 'Heading Rates' of 15 per cent and 20 per cent on 'Made in Canada' products. However, we are opposed to any increase in the existing tariff structure affecting any chemical not made in Canada and used in the manufacture of pharmaceutical products."(1)

More generally, the Association recommended that some end-use treatment be adopted for chemicals used by its members in the manufacture of pharmaceutical products. It recommended that rates of Free, B.P. and 15 p.c., M.F.N. should apply when the products are not made in Canada and rates of 15 p.c., B.P. and 20 p.c., M.F.N., when they are made. The list of chemicals in the present heading to which this proposal applies is as follows: bismuth salicylate is ruled made in Canada and, therefore, would be subject to the higher rates of the Association's proposal.

- * acetylsalicylic acid
- O-Acetylsalicylic acid
- * aluminum acetylsalicylate
- ammonium ferric citrate
- ammonium gluconate
- antimony potassium tartrate
- benzilic acid
- bismuth salicylate, basic
- bismuth 3:4:5-trihydroxybenzoate
- bismuth 3:4:5-trihydroxy-2-iodobenzoate
- isoButyl p-hydroxybenzoate
- * calcium citrate
- * calcium gluconate
- calcium gluconate galactogluconate
- * calcium lactate
- calcium lactate hydrous p.o. n.f.
- calcium lactobionate
- * calcium mandelate
- calcium salicylate
- * citric acid
- cyclandelate
- * dehydrocholic acid
- ethyl beta-3:4-dihydroxyphenylpropionate
- ethyl lactate
- * ferrous gluconate
- * gluconic acid
- glyceryl monoricinoleate
- m-Hydroxybenzoic acid
- p-Hydroxybenzoic acid

- * lactic acid
- * lithium citrate
- * lithium salicylate
- magnesium citrate
- * magnesium gluconate
- malic acid
- mandelic acid
- manganese citrate
- * manganous gluconate
- methyl p-hydroxybenzoate
- methyl p-hydroxybenzoate, sodium salt
- methyl parabenzoate
- * methyl salicylate
- phenyl salicylate
- * potassium bitartrate
- triPotassium citrate
- * potassium gluconate
- potassium hydrogen tartrate
- potassium salicylate
- * potassium sodium tartrate
- propyl parabenzoate
- n-Propyl p-hydroxybenzoate
- salicylic acid
- triSodium citrate
- * sodium gluconate
- sodium hydrogen tartrate
- sodium p-hydroxybenzoate
- sodium lactate
- * sodium salicylate
- sodium tartrate
- strontium lactate
- 5-sulphosalicylic acid
- * tartaric acid
- 3:3:3-trichlorolactic acid
- 3:3:3-trimethylcyclohexyl mandelate
- zinc glucoheptonate

* Reported to be "more important chemicals" by members of the Association

A letter from Harchem Limited on 12-hydroxy stearic acid was also recorded at the hearing on B.T.N. 29.16. The submission, made on behalf of Harchem, Emery Industries (Canada) Limited, Canada Packers Limited, Lever Brothers Limited and Procter & Gamble Co. of Canada Limited, noted that the commercial form contained also stearic acid; they, therefore, associated 12-hydroxy stearic acid with the fatty acids of B.T.N. headings 29.14 and 15.10 and requested that it be considered under B.T.N. 15.10 and be accorded rates of 15 p.c., B.P., 20 p.c., M.F.N.

One of the above chemicals, benzilic acid, was brought to the attention of the Board by Charles E. Frosst and Company, who use it in making steroid derivatives. It is not made in Canada and is imported free of duty under temporary tariff item 863. The company noted that the protection of Canadian industry is not involved and suggested that

the cost of these pharmaceutical chemicals should not be increased as a result of higher tariff rates. Its proposal was that tariff item 863 be continued.(1)

At the hearing on pesticides, in November 1962, a group of seven manufacturers of pesticides made a proposal concerning a list of biologically active materials for use in the manufacture of pesticide formulations. The companies were:

A.H. Howard Chemical Co. Ltd.	Orangeville, Ontario
Allied Chemical Services Ltd.	Calgary, Alberta
Chipman Chemicals Ltd.	Hamilton, Ontario
Gallowhur Chemicals Canada Ltd.	Lachine, Quebec
Manchester Products Ltd.	Galt, Ontario
Niagara Brand Chemicals	Burlington, Ontario
Green Cross Division	
Sherwin Williams Co. of	
Canada Ltd.	Montreal, Quebec

The companies proposed:

"The signatories of this brief share the view of the Chemical Industry Committee that, when a biologically active chemical, now on Appendix II, is made in Canada, it should become subject to the duty rates which have been recommended for the appropriate B.T.N. heading."(2)

The proposal was based on the belief that a duty on biologically active materials, not made in Canada, would increase the prices of pesticides to Canadian users without producing off-setting advantages for any segment of industry. The products under the present heading are:

chloromethyl phenoxy butyric acid
 2,4-dichlorophenoxy butyric acid
 esters of 2,4-dichlorophenoxy-butyric acid
 esters of silvex
 M.C.P.A. acid
 mecoprop
 silvex

(1) Transcript, Vol. 78, p. 11952

(2) Same, Vol. 108, p. 16332-3

SULPHURIC ESTERS AND THEIR SALTS, AND THEIR HALOGENATED,
SULPHONATED, NITRATED OR NITROSATED DERIVATIVES - B.T.N. 29.17

Many alcohols react with mineral and organic acids to form esters. If not all of the acidic elements of the inorganic polybasic acids are replaced in the reaction, the result is an ester-acid which, with appropriate treatment, produces a salt of the ester of mineral acid. Heading 29.17 pertains to the esters and salts derived from sulphuric acid; headings 29.18-29.21 classify esters and salts of other acids.

"A sulphuric ester is an organic chemical which can be obtained from the reaction of an alcohol or a phenol with sulphuric acid. Sulphuric acid...has two acid radicals... A sulphuric ester salt results when one acid group of the molecule is esterified with an alcohol or phenol and the other is neutralized with an inorganic base (e.g., sodium hydroxide)."(1)

The Board heard representations on some sixty-five esters and salts, namely the sulphates and the ammonium, sodium, potassium and lithium salts of:

- cetyl alcohol
- cetyl-oleyl alcohol
- lauryl alcohol
- oleyl alcohol
- stearyl alcohol
- decyl alcohol
- 2-ethyl hexyl alcohol (octanol)
- hexyl alcohol
- isodecanol
- isooctyl alcohol
- nonyl alcohol
- tridecanol

Some esters and salts of all the twelve named alcohols are made in Canada by Hart Products Co. of Canada Limited. Derivatives of the first five alcohols were made in commercial quantities at the time of the hearing (October, 1961) by this company, while derivatives of the remaining alcohols were made on a limited scale only and were said to be in the development stage.

All of these products are surface-active agents with varying degrees of wetting and detergency powers. Sulphated ammonium, potassium, sodium and lithium salts of cetyl alcohol, of cetyl-oleyl alcohol and of stearyl alcohol were said to be interchangeable, depending on raw material prices. Their main use is as softening agents for textile finishing. The sulphated ammonium, sodium, potassium and lithium salts of lauryl alcohol and oleyl alcohol are used by the aircraft and textile industries for upholstery cleaning and scouring. The sulphated ammonium, potassium, sodium and lithium salts of the eight remaining alcohols in the list, having good wetting ability but lower detergency than those of the first-mentioned alcohols, were expected to be used on a commercial scale in the textile and leather industries.

Few statistics are available, but the manufacturers said that foreign producers enjoy a large share of the Canadian industrial market for products of this type. Available data indicate imports of approximately \$500,000, though these might not be complete.

The Procter and Gamble Company of Canada, Limited, noted its interest in the manufacture of surface-active agents and said that:

"many single chemicals, properly classified in chapter 29, are essentially the same surfactants, and while most of these are not now commercially important, they could become so in future. Because of this, Procter and Gamble planned to deal with its recommendations at the hearing for heading No. 34.02."⁽¹⁾

Tariff Considerations

Only ammonium lauryl ether sulphate, ammonium lauryl sulphate, cetyl sulphate, stearyl sulphate, sodium lauryl ether sulphate and sodium lauryl sulphate, not of pharmacopoeia grade, have "made-in-Canada" status and, if imported, would be dutiable under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. Sulphated cetyl-oleyl alcohol was said to be dutiable under tariff item 220a(i) at rates of 15 p.c., B.P. and 20 p.c., M.F.N. The other products are dutiable under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N.

Both Hart Products Co. of Canada Limited and Procter and Gamble Company of Canada, Limited proposed rates of 15 p.c., B.P. and 20 p.c., M.F.N. for the single, chemically defined sulphated alcohol derivatives that may be classified to heading 29.17; Procter and Gamble noted that it intended to make the same proposals for the surface-active agents of heading 34.02.⁽²⁾ No exception for the pharmaceutical grade of sodium lauryl sulphate was proposed, although the present exception was noted.

The Hart Products Co. presentation noted that competition "for sales of surface active agents to the textile industry is particularly fierce."⁽³⁾ Competition comes from producers in the U.K. and U.S.A. where lower raw material costs, larger scale production and some transportation advantages were said to lend a competitive edge over Canadian manufacturers.

A proposal for duty-free entry was made for sodium 2,4-dichlorophenoxyethyl sulphate by a group of seven manufacturers of pesticides, in a joint submission on pesticides at the hearing of November 21, 1962. The product is a material used in the formulation of pesticides and free entry was requested for it "for use in the manufacture of goods described by Brussels Heading No. 38.11, and when not made in Canada."⁽⁴⁾ The general submission is dealt with in the part of the report on heading 38.11.

(1) Transcript, Vol. 67, p. 10125

(2) Same, Vol. 67, p. 10099, 10126

(3) Same, Vol. 67, p. 10098

(4) Same, Vol. 108, p. 16332

The spokesman for the Industry Committee stated that, in the Committee's opinion, all products of current commercial importance in heading 29.17 had been dealt with before the Board, and that all other chemicals of this heading should be dutiable at the general rates proposed, 15 p.c., B.P. and 20 p.c., M.F.N.

NITROUS AND NITRIC ESTERS, AND THEIR HALOGENATED, SULPHONATED,
NITRATED OR NITROSATED DERIVATIVES - B.T.N. 29.18

The Industry Committee stated that, in its submission, B.T.N. heading 29.18 was intended to have the same meaning as in the Brussels Nomenclature. Because nitrous and nitric acids are monobasic, they can give only neutral esters, and therefore heading 29.18, unlike heading 29.17, mentions their esters but not their salts.

Pentaerythritol Tetranitrate

Pentaerythritol tetranitrate is a white crystalline powder with explosive properties, made by nitrating pentaerythritol with nitric acid and purifying with acetone.⁽¹⁾ "P.E.T.N." is the commercial abbreviation. The only manufacturer in Canada is Canadian Industries Limited at Beloeil, Quebec. Most of the output (80 or 90 per cent) was reported either to be used captively by C.I.L. in making explosives or to be sold to a subsidiary company, the Canadian Safety Fuse Company, Brownsburg, Quebec, for the manufacture of detonating cord. A pharmaceutical grade of P.E.T.N. is made at Beloeil, in adequate quantity and quality to meet all Canadian needs.

Because of the product's extreme sensitivity to shock when dry, it is expensive to transport. The water, canvas bags, rubber bags and steel drums in which it is packed for shipment weigh more than the contained P.E.T.N. For pharmaceutical use, P.E.T.N. is mixed with other substances so that it comprises about ten per cent by weight; pentaerythritol tetranitrate is administered as a vasodilator, a heart stimulant.

Imports of pentaerythritol tetranitrate supplied all Canadian needs until about July 1960, when the Canadian Industries Limited plant began production. Imports for the first half of 1960 were estimated at about \$8,246.⁽²⁾ On the basis of the 1961 United States price of \$75 per 100 pounds, these imports would appear to have been about 11,000 pounds.

Under tariff item 666, imports are dutiable at rates of $1\frac{3}{4}$ cents per pound, B.P. and $2\frac{1}{4}$ cents per pound, M.F.N., an ad valorem equivalent, at current U.S. prices, of about 20 p.c., B.P. and 30 p.c., M.F.N. It is possible that P.E.T.N. is imported free of duty under tariff item 664a.⁽³⁾

The manufacturer, Canadian Industries Limited, in keeping with its proposal of uniform tariff rates for all organic chemicals, suggested that P.E.T.N. be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N.⁽⁴⁾

(1) Transcript, Vol. 67, p. 10128

(2) Department of Trade and Commerce, Spotlight on Chemicals, 1960

(3) Transcript, Vol. 67, p. 10141

(4) Same, Vol. 35, p. 5179-84

P.E.T.N. is one of the chemicals listed by the Canadian Pharmaceutical Manufacturers Association as of minor importance to its members. The Association recommended that some end-use treatment be adopted for chemicals used in the manufacture of pharmaceutical products and suggested that rates of Free, B.P. and 15 p.c., M.F.N. should apply when the chemicals are not made in Canada; when they are made in Canada, rates of 15 p.c., B.P. and 20 p.c., M.F.N. should apply.

Isosorbide Dinitrate

Isosorbide dinitrate was said to be used in the manufacture of pharmaceutical products, and not made in Canada. John Wyeth and Brother (Canada) Limited submitted that there should be no increase in duty rates until a substantial portion of Canadian requirements is available from Canadian production.⁽¹⁾ The current rates, under tariff item 208t are Free, B.P. and 15 p.c., M.F.N. No exception was taken to this proposal.

The Canadian Pharmaceutical Manufacturers Association listed the following chemicals, in addition to pentaerythritol tetranitrate, as used by its members in the manufacture of pharmaceutical products, and recommended that some end-use treatment be adopted for these chemicals when for that use. The Association proposed that rates of Free, B.P. and 15 p.c., M.F.N. should apply when the chemicals are not made in Canada and that, when they are made in Canada, rates of 15 p.c., B.P. and 20 p.c., M.F.N. are appropriate. Of these, amyl nitrite was listed as one of the more important chemicals.

amyl nitrite
erythritol tetranitrate
glycerol trinitrate
mannitol hexanitrate

The Industry Committee proposed that rates of 15 p.c., B.P. and 20 p.c., M.F.N. should apply to chemicals under the heading for which no other representations were made. Nitroglycerine, a chemical used in explosives, is classified by this heading if in unmixed form. No representations were made on the chemical, but it is a constituent in prepared explosives which are dealt with under B.T.N. heading 36.02.

⁽¹⁾ Transcript, Vol. 67, p. 10157

PHOSPHORIC ESTERS AND THEIR SALTS, INCLUDING LACTOPHOSPHATES,
AND THEIR HALOGENATED, SULPHONATED, NITRATED OR NITROSATED
DERIVATIVES - B.T.N. 29.19

Phosphoric acid, being tribasic, can produce three types of esters depending on whether one, two, or all of its acidic groups are esterified.

Phosphoric acid esters were referred to at the public hearing as "the reaction product of phosphoric acid anhydride (P_2O_5) and an organic alcohol ... in which three moles of alcohol react with one of P_2O_5 to give one mole of the 'mono' ester and one mole of the 'di' ester." (1)

Other reaction mechanisms may be used. "Mono" and "di" esters are commonly prepared as mixed esters. The Industry Committee's spokesman explained that, in spite of the suggestion of mixtures in their names, these esters were actually single chemical substances classified in the B.T.N. by heading 29.19. Tri-substituted phosphoric acid esters are the complete reaction products of alkyl or aryl alcohols with phosphoric acid, in which all three acid hydrogens of phosphoric acid are replaced with the organic grouping.

Most of the products brought to the Board's attention under this heading are individually of only small commercial importance in Canada, but they tend to be associated, in production or use, into groupings that take on greater significance. The products are generally known as organic acid phosphates.

A number of phosphates are made in Canada, a number of others were at the time of the hearing, regarded as products of potential manufacture, while others were being imported for resale. Many of the phosphates are used principally as plasticizers, in which use some interchangeability is possible; others have pharmaceutical applications. The products are dealt with below, for the most part, in convenient groups.

n-Butyl acid phosphate
Monoheptadecyl phosphate
Monohexadecyl phosphate
2-Ethylhexyl acid phosphate

These four organic phosphates are made in Buckingham, Quebec, by Electric Reduction Company of Canada Limited and are used as rust removers, acid catalysts for curing urea and melamine resins, and in the solvent extraction and refining of metals, such as thorium and uranium. (2)

Import statistics for these and for the following acid phosphates are not available separately. Imports of all the phosphate compounds of the heading probably exceed one million dollars a year.

(1) Transcript, Vol. 67, p. 10168-9

(2) Same, Vol. 67, p. 10169-70

Any imports of these phosphates bleached with hydrogen peroxide would be classified as preparations under tariff item 220a(i), dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N.⁽¹⁾ The chemicals, unbleached, if imported, would probably be classified by tariff item 218 (acid phosphates, not medicinal) at rates of Free, B.P. and 25 p.c., M.F.N., though it is understood that some may be entered under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N.

Electric Reduction proposed rates of 15 p.c., B.P. and 20 p.c., M.F.N. Naugatuck Chemicals Division of Dominion Rubber Company Limited, a consumer of n-butyl acid phosphate, took no issue with the proposed rates provided that the Board would also recommend the rates proposed by Naugatuck for the chemicals which it manufactures.⁽²⁾

Electric Reduction Company of Canada Limited also listed nine acid phosphates as development products, made in laboratory quantities at Buckingham, Quebec, and suitable for large-scale production with the same equipment as is used for making the four previous phosphates. These are:

Ethyl acid phosphate
 Propyl acid phosphate
 Iso-butyl acid phosphate
 Amyl acid phosphate
 Octyl acid phosphate
 Nonyl acid phosphate
 Dodecyl acid phosphate
 Hexadecyl acid phosphate
 Heptadecyl acid phosphate

The uses of these chemicals are similar to the uses of the first four acid phosphates. As in the case of the other acid phosphates, the manufacturer's understanding was that, if imported, they would be classified under tariff item 218 at duty rates of Free, B.P. and 25 p.c., M.F.N., though some may be entered under item 208t, Free, B.P. and 15 p.c., M.F.N. When used in the manufacture of plastics, the first seven chemicals on the list may be entered free of duty under item 921. The manufacturer proposed that these chemicals be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N. In support of this proposal, Electric Reduction stated that it has the facilities to make all of these acid phosphates.

Five phosphoric acid esters are imported by the Electric Reduction Company of Canada Limited for resale.⁽³⁾ These are:

Tributyl phosphate
 Tricresyl phosphate (tritolyl phosphate)
 Trixylenyl phosphate (tridimethylphenyl phosphate)
 Triethyl phosphate
 Triphenyl phosphate

(1) Transcript, Vol. 67, p. 10179

(2) Same, Vol. 67, p. 10222

(3) Same, Vol. 67, p. 10171

Tributyl phosphate is used in refining uranium, and in foam reduction for other mining and paper mill operations. Tricresyl phosphate and trixylenyl phosphate are plasticizers for a variety of plastics and also are added to motor fuels as lead scavengers and ignition control additives. Like tricresyl phosphate, triethyl phosphate adds fireproof characteristics to plastics for which it can be used alone or with other plasticizers. Triethyl phosphate may also be used in pesticides. Triphenyl phosphate, another plasticizer, adds fire retardant characteristics to cellulose acetate, nitrocellulose, and other resins and polymers.

A. Boake, Roberts & Company Limited of London, England proposed rates of Free, B.P., 15 p.c., M.F.N. for triphenyl phosphate until made in Canada. The company said it had capacity to supply the estimated Canadian annual requirements of 50 tons but at the time of the hearing was not exporting to Canada because it was non-competitive. The price of triphenyl phosphate was in the range of 30 to 40 cents a pound, fairly typical for this group of phosphate plasticizer.

Import data are incomplete, but the following table indicates significant imports of tricresyl phosphate, apparently for use principally as a plasticizer. The average value of imports of tricresyl phosphate in 1964 was approximately 33 cents a pound.

Imports of tricresyl phosphate, apparently mainly for plasticizer use, have been approximately as follows, as far as data are available.

Imports of Phosphoric Acid Derivatives, 1961-64

	<u>1961</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>
	- \$ per thousand -			
Tributoxy phosphate	80	95	150	..
Tricresyl phosphate	475	535	460	534
Others	<u>215</u>	<u>280</u>	<u>220</u>	<u>..</u>
Total	770	910	830	..

Source: Dept. of Industry, Chemical Import Trends; D.B.S., Trade of Canada, Imports

The imports of tricresyl phosphate in 1964, valued at \$534,000 in the above table, represented 1.6 million pounds, an average value of about 34 cents a pound. These imports were mostly from the U.S.A., with nearly 40 per cent coming from the U.K.

Shell Oil Company of Canada Limited uses tricresyl phosphate (TCP) as an additive to gasoline; the company indicated that almost three quarters of Canadian consumption of this chemical was for this purpose. Shell obtains its TCP from a Canadian agent of a United Kingdom manufacturer which, in the opinion of the company, supplies practically all of the tricresyl phosphate used in Canada. The spokesman for Electric Reduction Company, agreeing that probably all the TCP came from the United Kingdom, added that almost all the tributyl phosphate came from the United States.

A. Boake, Roberts and Company, Limited made a combined submission on tricresyl phosphate (tritolyl phosphate) and trixylenyl phosphate (trixylol phosphate) which are imported from Britain by the company's sole agent, Caledonian Company.⁽¹⁾ The company estimated that the combined use in Canada of the two phosphates was 500 to 550 tons per year, with 70 per cent for use in gasoline and the balance principally for the manufacture of adhesives and plasticizers.

A. Boake, Roberts also claimed to have supplied over 80 per cent of the total Canadian consumption of phosphate plasticizers in 1960. The spokesman for this firm added that in Canada the tricresyl phosphate is the popular product, but that its use as a plasticizer is gradually decreasing because of recent developments of more efficient plasticizers at more attractive prices. This trend, plus the possibility that TCP could be replaced as a gasoline additive, were cited as obstacles to Canadian production of tricresyl phosphate.

Very little information for this group of tri-substituted phosphates is readily available. The spokesman for A. Boake, Roberts indicated that the price of tricresyl phosphate, at the time of hearing in 1961, was "from 30 cents per pound to 33 cents per pound in Canadian funds, delivered ... That price has strengthened by one or two cents a pound since 1960. Previously ... it was selling around 28½ cents a pound," and that of triphenyl phosphate was "in the 30 cents to 40 cents a pound range."⁽²⁾

All five of the named phosphates are classified by tariff item 208t, Free, B.P. and 15 p.c., M.F.N. It was the opinion of A. Boake, Roberts that tricresyl phosphate was entered free of duty under tariff item 921 when for use in the manufacture of synthetic resin, vinyl type. Under this item, the higher-priced U.S. tricresyl phosphate was said to be competitive with that from the United Kingdom. In addition, triethyl phosphate, trixylenyl phosphate and triphenyl phosphate may be entered under item 921. Triethyl phosphate may also be entered free of duty under item 791 when for use in the manufacture of pesticides. Some tributyl phosphate is believed to be entered in compounds of tetraethyl lead under tariff item 263 at rates of Free, B.P. and 5 p.c., M.F.N. However, such imports are likely to be small.

By all of the proposals, entry of tributyl, tricresyl, trixylenyl, triethyl and triphenyl phosphates would be at rates of Free, B.P. and 15 p.c., M.F.N. until such time as they are made in Canada; when any product was made in Canada, it would attract rates of 15 p.c., B.P. and 20 p.c., M.F.N. as proposed by the Industry Committee for an item like heading 29.19. No opposition to these proposals was made.

Naugatuck Chemicals Division of Dominion Rubber Company Limited named tri-*o*-cresyl phosphate and *n*-butyl acid phosphate as raw materials for which it took no issue with the proposed rates provided that the Board also recommends the rates proposed by Naugatuck for the chemicals it manufactures.⁽³⁾

(1) Transcript, Vol. 67, p. 10203

(2) Same, Vol. 67, p. 10211-2

(3) Same, Vol. 67, p. 10222; Vol. 6, p. 899

Tributoxyethyl phosphate is a primary plasticizer for most resins and gives them flame retardance and low-temperature, permanent flexibility. In resin emulsion floor waxes, it acts as a high boiling solvent and as a levelling agent. The Board was told that, until the discovery of these properties, resin emulsions could not be used for household and commercial use.

Very little information is available on imports of tributoxyethyl phosphate; they were reported to be about \$28,000 in the first half of 1959 and over \$40,000 in the first half of 1960.

On behalf of its members, the Canadian Manufacturers of Chemical Specialties Association stated that tributoxyethyl phosphate is not made in Canada, competes with no Canadian substitute, and is imported duty-free under tariff item 921 when used for making plastics; more generally it may be imported under item 208t at Free, B.P., 15 p.c., M.F.N. The Association proposed that this material be allowed duty-free entry until made in Canada in suitable quantities. No opposition was heard.

There is no known Canadian production of octyl diphenyl phosphate. Some members of the Rubber Association of Canada use it as a plasticizer in the production of synthetic resin film. Import information on this plasticizer is not published.

The Rubber Association of Canada indicated its wish to defer discussion of octyl diphenyl phosphate until the end-use hearings beginning on February 25th, 1963, on tariff item 921. At that hearing the product was not named specifically but was included in the Association's discussion of materials used in the production of plastics and plastic products; it was included in the general term "plasticizers", and the Association recommended the retention of item 921 which permits duty-free entry as long as the products are of a kind not made in Canada.⁽¹⁾ Octyl diphenyl phosphate at present may be imported free of duty under tariff item 921.

The spokesman for Shawinigan Chemicals Limited objected to the exclusion of this chemical from the provisions of the heading rates for B.T.N. 29.19, that is 15 p.c., B.P. and 20 p.c., M.F.N. The Shawinigan argument was based on the competitiveness of compositions made from this imported plasticizer with plasticizer compositions made from Canadian raw materials.⁽²⁾ At a later hearing, Shawinigan Chemicals recommended the abolition of end-use tariff item 921.⁽³⁾

2-methyl-1, 4-naphthohydroquinone diphosphate is an ingredient for a pharmaceutical product designed to control bleeding. Not made in Canada, it is imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N.

Consumption and import data are not available.

(1) Transcript, Vol. 123, p. 18397

(2) Same, Vol. 67, p. 10215

(3) Same, Vol. 173, p. 28300

Hoffman-LaRoche Limited, an importer of the material, proposed that the existing rates of duty should remain.(1) No objection was made to this proposal.

The Canadian Pharmaceutical Manufacturers Association expressed an interest in seven chemicals under heading 29.19, used in the manufacture of pharmaceutical products and dutiable under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. The products are:

- * Calcium glycerophosphate
- Ferric glycerophosphate
- Glycerophosphoric acid
- Magnesium glycerophosphate
- Manganese glycerophosphate
- * Potassium glycerophosphate (75% solution)
- * di Sodium alpha-glycerophosphate
 (sodium glycerophosphate)

* "more important" chemicals to members of the Association

The Association's proposals were that chemicals, not made in Canada, when employed in the manufacture of pharmaceutical products for human or animal use, should be dutiable at rates of Free, B.P. and 15 p.c., M.F.N. unless otherwise provided for; and that chemicals made in Canada should be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N.(2)

A proposal for duty-free entry was made for four biologically-active chemicals of this heading by seven manufacturers of pesticides in a joint submission on pesticides under B.T.N. heading 38.11. Duty-free entry was requested when the products were for use in the manufacture of goods described by Brussels Heading No. 38.11, and when not made in Canada.(3) The four named chemicals are:

Dichlorvos (dimethyl 2,2-dichlorovinyl phosphate)
 Dimethyl carbomethoxy propenyl phosphate
 Dimethyl-1,2-dibromo-2,2-dichloroethyl phosphate
 T.E.P.P. (tetraethyl pyrophosphate)

All four products probably are entered free of duty under tariff item 791. The general submission is dealt with in the part of the report on heading 38.11.

The Industry Committee expressed the view that all products which had current commercial importance were dealt with in the submissions for the hearing. The Committee recommended that other products be accorded tariff treatment of 15 p.c., B.P. and 20 p.c., M.F.N. under a general provision for the heading.

(1) Transcript, Vol. 67, p. 10223

(2) Same, Vol. 87, p. 13321

(3) Same, Vol. 108, p. 16332

CARBONIC ESTERS AND THEIR SALTS, AND THEIR HALOGENATED,
SULPHONATED, NITRATED OR NITROSATED DERIVATIVES - B.T.N. 29.20

Chemicals of this heading are derived from carbonic acid and are analogous to the sulphuric acid derivatives of heading 29.17 in that both acids are dibasic and can form acid or neutral esters. The Industry Committee submitted its agreement with the definition of these chemicals as described in the Explanatory Notes to the Brussels Nomenclature, 1955.(1)

Guaiacol Carbonate

The only chemical on which a submission was made to the Board under heading 29.20 is guaiacol carbonate, made in the United Kingdom by W.J. Bush and Company Limited. That firm's wholly-owned subsidiary, W.J. Bush and Company (Canada) Limited, imports guaiacol carbonate for use as an expectorant and antiseptic in cough medicines. The parent company was said to be capable of supplying a large part of world requirements of this material.

Imports enter Canada at rates of Free, B.P. and 15 p.c., M.F.N. under tariff item 208t. The importer proposed the continuation of these rates and no opposition was heard.(2)

No other chemical in this heading was named before the Board. The Industry Committee proposed the heading classification and rates of 15 p.c., B.P., 20 p.c., M.F.N. for all other products of heading 29.20.

(1) Transcript, Vol. 67, p. 10227

(2) Same, Vol. 67, p. 10228

OTHER ESTERS OF MINERAL ACIDS (EXCLUDING HALIDES) AND THEIR SALTS,
AND THEIR HALOGENATED, SULPHONATED, NITRATED OR NITROSATED
DERIVATIVES - B.T.N. 29.21

Continuing the series of ester derivatives of mineral acids of B.T.N. headings 29.17 to 29.20 inclusive, this heading covers esters and ester derivatives of other mineral acids, excluding esters of halo-acids (generally heading 29.02) and excluding esters of later headings, for example hydrogen sulphide esters (generally heading 29.31).

Only one product was brought to the Board's attention at the hearing on this heading, but a number of other products classified by the heading were part of general submissions at later hearings. These are noted below. Very little commercial information is available concerning these products.

2-(p-tert-butylphenoxy) isopropyl-1-2-chloroethyl sulphite is also known as butylphenoxy isopropyl chloroethyl sulphite. The trade name for this chemical is "Aramite". It is a pesticide particularly effective against mites which attack ornamental shrubs. It is produced in a reaction involving ethylene chlorohydrin, thionyl chloride, propylene oxide and p-tert-butylphenol. At the time of the hearing in 1961, it was said to be not made in Canada and imported by Naugatuck Chemicals Division of Dominion Rubber Limited from Naugatuck Chemical (U.S.A.) under tariff item 791, free of duty. The company representative indicated the volume of imports was not large.

As long as aramite is not made in Canada the company proposed that duty-free entry should continue, but when made in Canada, it should become dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N., "provided that the end products made from this chemical are subject to the same rates of duty."(1)

Diphenyl isodecyl phosphite
Triphenyl phosphite
Tridecyl phosphite

Ferro Enamels (Canada) Limited of Oakville, Ontario, imports the three chemicals listed above to make stabilizers for the manufacture of vinyl type resins. These chemicals, at the time of the plastics hearing, in May 1963, were imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. Since that time, however, triphenyl phosphite has been provided for under temporary tariff item 216e free of duty under both the B.P. and M.F.N. Tariffs when for use in the manufacture of stabilizers for vinyl synthetic resins.

The three materials were said not to be made to the required specifications in Canada and were imported from the United States. The stabilizers made by Ferro Enamels compete with stabilizers imported duty-free under tariff item 921. Tridecyl phosphite and diphenyl isodecyl phosphite are imported from the U.S.A. dutiable at 15 p.c. The

(1) Transcript, Vol. 67, p. 10237

company claimed that it uses Canadian materials when they meet specifications, and claimed that the duty on imported materials resulted in a narrow operating margin because prices on its products must be competitive with duty-free imports. Therefore it proposed that, until these raw materials of adequate quality are made in Canada, they be entered free of duty from B.P. and M.F.N. sources and when made in Canada, the rates of duty be 15 p.c., B.P. and 20 p.c., M.F.N. (1)

The representative for Ferro Enamels indicated that his firm had also submitted a proposal for rates of 15 p.c., B.P. and 20 p.c., M.F.N. on the stabilizers imported under tariff item 921, except tin-bearing stabilizers. (2) These stabilizers are discussed under B.T.N. heading 38.19 in this report.

Diethyl dichlorophenyl thiophosphate
Dimethyl trichlorophenyl thiophosphate (Rommel)
Dioxane bis (diethyl) dithio phosphate
Parathion

The four chemicals named above were the subject of a proposal for duty-free entry by a group of seven manufacturers of pesticides in a joint submission on pesticides at the hearing of November 21, 1962. The chemicals are materials used in the formulation of pesticides and free entry was requested for them "for use in the manufacture of goods described by Brussels Heading 38.11, and when not made in Canada." (3) The general submission is dealt with in the part of the report on heading 38.11.

The Industry Committee expressed the view that all products currently of commercial importance were dealt with in submissions which the Board had received. The Committee proposed that other products be accorded tariff treatment of 15 p.c., B.P. and 20 p.c., M.F.N. under a general heading provision.

(1) Transcript, Vol. 165, p. 24407

(2) Same, Vol. 173, p. 28345

(3) Same, Vol. 108, p. 16332

AMINE-FUNCTION COMPOUNDS - B.T.N. 29.22

Amines are organic nitrogen compounds which may be regarded as derived from ammonia by replacing one or more of the hydrogen atoms with one or more hydrocarbon radicals. A primary amine is formed when only one hydrogen atom is replaced, a secondary amine when two hydrogen atoms are replaced and a tertiary amine when all three hydrogen atoms are replaced. Amines react with inorganic acids to form salts, classified by heading 29.22. The heading also applies to amine compounds in which one or more halogen, sulphonate, nitro or nitroso groups have been substituted for one or more hydrogen atoms in the hydrocarbon radical.

This heading includes some chemicals which are produced as intermediate chemicals in the manufacture of the polyamide, nylon. Discussion of these intermediates has been reserved for a separate section toward the end of this part of the report where general submissions on nylon intermediates and salts are also considered. Reference to adipic acid (B.T.N. 29.15), adiponitrile (29.27) and caprolactam (29.35) is also made in that section, although these chemicals are discussed under their respective headings.

Apart from the nylon intermediates, a large number of products were the subject of representation under this heading. Most of the chemicals listed in submissions are not made in Canada and their uses are specialized, for example, to the manufacture of pesticides, of colours and of rubber and pharmaceutical products. As a result, very few have an annual consumption in excess of \$100,000 and many are used in considerably smaller amounts. Taken together, these products probably have an annual commercial value of between one and two million dollars. However, the nylon chemicals made in Canada far exceed in economic significance the imports of all of the products of the heading. The estimated value of all of the products of the heading, including an allowance for captive production, is well in excess of ten million dollars a year.

The Industry Committee said that all chemicals of known commercial significance were dealt with in submissions before the Board, and proposed that all the other chemicals of the heading be dutiable at the rates suggested for the heading, 15 p.c., B.P. and 20 p.c., M.F.N.

In a letter to the Board, referred to at the hearing in January 1962, Rohm and Haas Company of Canada Limited recommended that all the amine-function chemicals of heading 29.22 be admitted to Canada duty-free under both B.P. and M.F.N. Tariffs except when they qualify for a made in Canada ruling. The spokesman for the Industry Committee noted that the Committee took the opposite view, that chemicals should be dutiable at the general heading rates "subject to exceptions which may be requested." (1)

(1) Transcript, Vol. 68, p. 10250

Imperial Chemical Industries Limited (I.C.I.) submitted a brief on dimethylamine and diethylamine, both of which are used in synthesizing more complex nitrogen-containing organic chemicals used as rubber vulcanizers, crop protection chemicals and pharmaceuticals. The two chemicals are not made in Canada and are imported from the U.K., the U.S.A. and West Germany. The Canadian market for dimethylamine was said to be for about 400,000 pounds per year and for diethylamine, about 100,000 pounds per year; in 1963, the value of imports of dimethylamine was some \$170,000; that of diethylamine was not separately reported. Imports of dimethylamine are mostly from the U.S.A., while those of diethylamine come about equally from the U.K. and the U.S.A. These chemicals are imported currently under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N., although dimethylamine may be entered free of duty under tariff items 791, 851 and 921, when for making insecticides, synthetic rubber or synthetic resin products respectively. I.C.I. recommended that the rates of duty remain unchanged until the products are made in Canada at which time they should be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N. Naugatuck Chemicals Division of Dominion Rubber Company Limited recommended that imports of these chemicals be duty-free under all Tariffs until the products are made in Canada.

Diethylamine was listed as a more important chemical used by the members of the Canadian Pharmaceutical Manufacturers Association. The Association recommended that chemicals, not made in Canada, for the manufacture of pharmaceuticals be dutiable at rates of Free, B.P., 15 p.c., M.F.N.; when made in Canada, they would be dutiable at 15 p.c., B.P., 20 p.c., M.F.N.

Imperial Chemical Industries also expressed its interest in di-beta-naphthyl-para-phenylenediamine (DNPD), used to inhibit the oxidation and consequent deterioration of rubber. Consumption in Canada was estimated to be valued at about \$50,000 per year; at the price of about \$1.25 per pound, this value would represent about 40,000 pounds. Most of the Canadian demand is met by suppliers in the United Kingdom. It is at present dutiable under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N., and Imperial Chemical Industries Limited proposed that these rates be continued until the chemical is made in Canada in quantity substantial in relation to Canadian demand.⁽¹⁾ When used in the manufacture of synthetic resins and plastics, it may be entered free of duty under tariff item 921.

For the five chemicals listed below, Robinson Brothers Limited opposed the application of the Industry Committee's heading rates of 15 p.c., B.P. and 20 p.c., M.F.N. saying that, as these products are not made in Canada, the rates of duty currently in effect under tariff item 208t, Free, B.P. and 15 p.c., M.F.N., should remain until such time as the products are produced in Canada. No other argument and no data were presented and no opposition was heard. The chemicals are:

benzylamine
dibenzylamine
tribenzylamine
N-benzyl dimethylamine
N-benzyl methylamine

(1) Transcript, Vol. 68, p. 10264

Dibenzylethylenediamine was the subject of a presentation by Charles E. Frosst and Company. It is not made in Canada and is imported by Frosst from the United Kingdom for use in the synthesis of benzathine penicillin G which, in turn, is used in the treatment of a wide variety of infections. The company noted that increased costs to medical patients would flow from increases in the rates of duty on this chemical and recommended that the rates currently in effect under tariff item 208t, Free, B.P. and 15 p.c., M.F.N., be continued.

Lever Brothers Limited expressed its interest in sodium methyl taurine, used as an intermediate in the manufacture of surface-active agents and soap bars. Not made in Canada, it is imported from the United States. There was said to be a market for about 600,000 pounds per year, at a price of about 30 cents per pound. At present it is imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N., but Lever Brothers proposed that imports be free of duty under both Tariffs until it is made in Canada, at which time rates of 15 p.c., B.P. and 20 p.c., M.F.N. should apply.

Cyclohexylamine, a chemical used in the manufacture of a rubber accelerator, was the subject of a proposal for free entry, under both B.P. and M.F.N. Tariffs, by Monsanto Canada Limited and by Naugatuck Chemicals. It is not made in Canada and is imported from Germany, the U.K. and the U.S.A. Naugatuck Chemicals uses cyclohexylamine as a raw material for the manufacture of other chemicals. Monsanto had originally suggested that the rates currently in effect, Free, B.P. and 15 p.c., M.F.N. should remain, but subsequently found that the U.K. source of supply was inadequate and that supplies would have to be obtained from M.F.N. countries; the company, therefore, proposed free entry under both Tariffs. Total Canadian consumption was estimated at about 350,000 pounds per year. Imports were valued at \$105,000 in 1962 and at \$180,000 in 1963.

Naugatuck Chemicals Division of Dominion Rubber Company Limited dealt with aniline, of which it is the only Canadian producer. Aniline is used to make chemicals, in turn used in the manufacture of rubber and pesticides. One of these rubber chemicals is diphenylamine, also classified under this heading and produced by Naugatuck as an intermediate chemical. Only about 5 per cent of use was said to be accounted for by sales, most of production being for Naugatuck's own use.⁽¹⁾ Imports were estimated at less than one per cent of domestic production. The price of aniline was said to be 19 cents per pound in tank car lots, delivered in Ontario and Quebec.

Aniline oil, crude, and aniline and coal tar dyes are named in tariff items 203 and 203b respectively. The aniline made by Naugatuck is synthetic, made from nitrobenzene, in turn made from benzene; this aniline was said to be about 99½ per cent pure. The crude aniline oil of item 203 is probably, historically, an aniline oil derived from indigo. This tariff item and item 203b permit duty-free entry when the chemicals are adapted for dyeing and, in certain instances, for tanning. If for pesticidal use, they may be imported free of duty under tariff item 219a or 791. More generally, synthetic aniline is entered under item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. Naugatuck

(1) Transcript, Vol. 68, p. 10321

Chemicals requested that all imports of aniline be subject to duties of 15 p.c., B.P. and 20 p.c., M.F.N. No reasons were given for the proposal of these rates specifically for aniline.

The same company submitted a brief on diphenylamine, of which Naugatuck Chemicals is the only producer in Canada. Large quantities were used in war-time as a stabilizer for smokeless powder; more recent applications have been in the manufacture of chemicals used in making rubber. This use provides a captive market for nearly all of Naugatuck's production. The price was said to be \$1.33 per pound. It is imported in small quantities and is entered under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. The company recommended that these rates of duty should continue.

An anti-scorch material, N-nitrosodiphenylamine, is used in making both natural and synthetic rubbers and is made in Canada by Naugatuck Chemicals from diphenylamine. The price was said to be 56.5 cents per pound, but other data concerning production and imports are not available. It is currently imported under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N., rates which the company requested should continue.

Another chemical, phenyl-b-naphthylamine (PBNA), is used as an antioxidant in the manufacture of rubber. It is made in Canada by Naugatuck Chemicals and sold for 58 cents per pound at the time of the hearing in January 1962. The company noted that, while import statistics are not readily available, the chemical "is often imported in mixtures with other antioxidants under Tariff Item 711..."⁽¹⁾ Under this item the rates of duty are 15 p.c., B.P. and 20 p.c., M.F.N. and the company recommended that these rates be retained. Polymer Corporation Limited noted that this chemical is imported duty-free under tariff item 851 when for use in making synthetic rubber, and proposed that duty-free entry for this use be continued.

Diphenyl-p-phenylenediamine is another antioxidant used in the manufacture of rubber. It is made in Canada by Naugatuck Chemicals and the company reported that it is also imported in mixtures with other antioxidants. Imports are entered into Canada under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N., and the company recommended that these rates be continued.

Although Naugatuck Chemicals does not make the chemicals listed below, it makes the acid precursors and therefore reiterated its statement that the company:

"could not maintain our position as a manufacturer of chemicals in Canada if placed under a competitive disadvantage caused by higher duty rates on raw materials, unless we receive commensurate protection for the products which we make, and unless our customers receive commensurate protection for the formulations which they make."⁽²⁾

⁽¹⁾ Transcript, Vol. 68, p. 10342

⁽²⁾ Same, Vol. 68, p. 10351

These salts are used as weed killers, and may be imported into Canada free of duty under tariff item 791; Naugatuck recommended that the rates be 15 p.c., B.P. and 20 p.c., M.F.N., in order to protect the company's manufacture of the precursors. The salts are:

2,4-dichlorophenoxyacetic acid amine salts
2-methyl-4-chlorophenoxyacetic acid amine salts
2,4,5-trichlorophenoxyacetic acid amine salts

A spokesman for the Industry Committee indicated that, as oxygen-function amino compounds, the above salts might more properly be classified by heading 29.23.

In addition to the products dealt with above, Naugatuck Chemicals also brought dibutylamine, diethylaniline and a-naphthylamine to the attention of the Board. None of these is made in Canada and Naugatuck recommended that they be admitted free of duty until they are produced in Canada. Currently, diethylaniline is imported free of duty under the end-use provisions of tariff item 921, for the manufacture of synthetic resins, and a-naphthylamine is imported duty-free under tariff item 791, as a material for the manufacture of pesticides. Dibutylamine is dutiable at rates of Free, B.P. and 15 p.c., M.F.N. under item 208t. These chemicals might also be imported free of duty under tariff item 203f when for the manufacture of coal-tar dyes.

Merck Sharp and Dohme of Canada Limited proposed that rates of Free, B.P. and 15 p.c., M.F.N., those currently in effect under tariff item 208t, should continue for the following chemicals; no data were submitted concerning them:

hexylcaine hydrochloride
mecamylamine hydrochloride

The Rubber Association of Canada presented a brief on a number of chemicals used in the manufacture of rubber products. One of these, triethylene diamine, not made in Canada and used as a catalyst in making polyurethane foam, is imported duty-free under tariff item 921. The Association requested that it remain duty-free "for the end-uses specified in tariff item 921 as long as it is held to be 'of a kind not produced in Canada'." (1) The other five chemicals listed below are used to prolong the serviceable life of rubber products. With the exception of N-isopropyl-N-phenyl-P-phenylene diamine which is entered under item 711, they are not made in Canada and are imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. In supporting this proposal, the Association said that member companies are of the opinion "that there are no satisfactory substitutes at economic prices for the chemicals of its choice." (2) The spokesman for the Industry Committee drew critical attention to "the rather careful wording" of this phrase. The Association requested that these chemicals remain subject to rates no higher than the present rates if not of a kind made in Canada. The chemicals are as follows:

(1) Transcript, Vol. 68, p. 10366

(2) Same, Vol. 68, p. 10368

~~p-isopropoxy diphenylamine~~
~~N-isopropyl-N-phenyl-p-phenylene diamine~~
~~diphenylethylenediamine~~
~~NN-bis-(1-methyl heptyl)-p-phenylenediamine~~
~~phenyl-alpha-naphthylamine~~

The Canadian Color Makers Association drew the Board's attention to a number of chemicals used as intermediates in the making of dyes. These chemicals, not made in Canada, are currently free of duty under tariff item 203f, if for use in the manufacture of coal-tar dyes; otherwise they are dutiable under tariff item 208t or 216 at Free, B.P., 15 p.c., M.F.N. The Association requested that they be duty-free until made in Canada. They are imported from the United Kingdom, other European countries and the United States. The chemicals of interest are:

~~p-toluidine-m-sulphonic acid~~
~~2-chlor-4-aminotoluene-5-sulphonic acid~~
~~2-chlor-5-aminotoluene-4-sulphonic acid~~
~~2-naphthylamine-1-sulphonic acid~~
~~p-nitro-o-toluidine~~
~~o-chlor-p-nitroaniline~~
~~p-chlor-o-nitroaniline~~
~~m-nitro-p-toluidine~~
~~p-nitroaniline~~
~~3-3-dichlorobenzidine~~
~~o-nitroaniline~~
~~2-5-dichloroaniline~~
~~m-nitro-o-toluidine~~
~~1-naphthylamine-2-sulphonic acid.~~
~~6-aminonaphthylene-2-sulphonic acid~~

The Canadian Pharmaceutical Manufacturers Association submitted a list of chemicals which its members use as raw materials. The Association noted its opposition to any increase in the existing rates of duty affecting any chemical not made in Canada and used in the manufacture of pharmaceutical products. The materials listed below are those "of prime interest" to the Association.⁽¹⁾ These chemicals are currently imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N.; the Association proposed that these rates should continue. The materials listed, the more important being marked by an asterisk, are:

~~dibenzylethylene diamine~~
 * ~~dibenzylethylene diamine diacetate~~
~~methamphetamine hydrochloride~~
~~amphetamine sulphate~~
~~dextro amphetamine sulphate~~
~~NN-bis (1-methyl-3-(2-2-6-trimethyl-
 cyclohexyl) propyl~~
~~NN-dimethyl-1,6-hexanediamine-bis-
 (methochloride)~~
~~propylhexedrine~~
~~tranlycypromine sulphate~~

(1) Transcript, Vol. 68, p. 10390

Smith Kline and French Inter-American Corporation submitted a brief generally supporting the proposal by the Canadian Pharmaceutical Manufacturers Association. Three additional products were included in this submission. These were:

Ethyl-dimethyl-3-hydroxyphenol ammonium chloride
1-Methyl-4-(3-chloropropyl)-piperazine
Phenoxybenzamine hydrochloride

Following the hearings on B.T.N. Chapter 29, the Pharmaceutical Manufacturers Association submitted a further list of chemicals used by its members in the manufacture of pharmaceutical products. The Association recommended that rates of Free, B.P. and 15 p.c., M.F.N. should apply when the chemicals are not made in Canada and are used in the manufacture of pharmaceutical products. Rates of 15 p.c., B.P. and 20 p.c., M.F.N. were proposed when they are made in Canada. The list of products for heading 29.22 is as follows:

2-Aminoheptane
Amphetamine
(+) Amphetamine — see Dexamphetamine
Amphetamine phosphate
Amphetamine sulphate
Dexamphetamine
Dexamphetamine sulphate
Diaminoethane
Mecamylamine hydrochloride
Mephentermine sulphate
Methylamine
Triethylamine
m-Trifluoromethylaniline
Sulphanilic acid
Propylhexedrine hydrochloride

Triethylamine phosphate is used by manufacturers of paint and varnish to reduce can corrosion and it is also used as a corrosion inhibitor in anti-freeze compounds for internal combustion engines. It was brought to the Board's attention by the Electric Reduction Company of Canada Limited, which said that it could make the chemical at its plant at Buckingham, Quebec. Imports may be entered into Canada under tariff item 218 at rates of Free, B.P. and 25 p.c., M.F.N., or under item 208t at Free, B.P., 15 p.c., M.F.N. The company recommended that triethylamine phosphate be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N.

Polymer Corporation Limited expressed an interest in alkylated diphenylamine, diphenylamine-acetone reaction product, diaryl-p-phenylene diamine and phenyl-b-naphthylamine which the company uses in the manufacture of synthetic rubber. When for this purpose, they are free of duty under tariff item 851. The company said "we consider it essential the tariff provisions in respect of materials for use in the manufacture of synthetic rubber, now contained in Item 851, be continued..."(1) The company noted that some of these products might also be mixtures classified by heading 38.19.

(1) Transcript, Vol. 68, p. 10420

A proposal for duty-free entry was made for a number of chemicals by a group of seven manufacturers of pesticides, in a joint submission at the hearing of November 21, 1962, on pesticides. The products are materials used in the formulation of pesticides and free entry was requested for them "for use in the manufacture of goods described by heading 38.11, and when not made in Canada."⁽¹⁾ The general submission is dealt with in the part of the report on heading 38.11. The materials of heading 29.22 referred to are:

Butyl chlorophenyl methyl methylphosphoramidate
Dichlorophenyl methyl isopropyl phosphoramidothioate

When used in the manufacture of pesticides, these chemicals may be entered free of duty under tariff item 791; more generally they are imported under item 208t at Free, B.P., 15 p.c., M.F.N.

Nylon Intermediates

Nylon is a generic term "for any long-chain synthetic polymeric amide which has recurring amide groups as an integral part of the main polymer chain, and which is capable of being formed into a filament in which the structural elements are oriented in the direction of the axis."⁽²⁾ There are three principal types of nylon: nylon 6/6, nylon 6 and nylon 610. The process of production and the raw materials differ somewhat from one resin to another, although certain intermediate chemicals, formed as part of the process of producing nylon, serve more than one type of nylon. Many of the chemical intermediates used in the production of nylon are classified under various headings of B.T.N. Chapter 29; three important ones of the later stages of production are in heading 29.22. In 1965, only nylon 6/6 polymer was being made in Canada, together with its raw materials and intermediate chemicals, but facilities exist for producing nylon 6 filament from imported polycaprolactam and are being established to make polycaprolactam from the imported monomer, caprolactam.

In this section an outline is given of the production of nylon resin and of the use, in its production, of several of the chemical intermediates; the polymer, or resin, is discussed under B.T.N. heading 39.01.

Nylon 6/6 is made in Canada by Du Pont of Canada Limited and by Millhaven Fibres Limited. New facilities are being built by Courtaulds Canada Synthetic Fibres Limited and Union Carbide Canada Limited to make nylon 6. Millhaven Fibres Limited, formerly a wholly-owned subsidiary of Canadian Industries Limited, became a jointly-owned subsidiary of C.I.L. and Chemcell (1963) Limited in 1964. These two companies are also joint owners of a fibre-marketing subsidiary, CEL-CIL Fibres Limited.

In the manufacture of nylon 6/6 salt by Du Pont, cyclohexane and air are reacted to produce a mixture of cyclohexanol and cyclohexanone; when the mixture is reacted with nitric acid, adipic acid is formed. Adipic acid is one of the principal ingredients of nylon 6/6

(1) Transcript, Vol. 108, p. 16332

(2) Same, Vol. 64, p. 9538

salt and, treated with ammonia, is used to make adiponitrile. The adiponitrile is treated with hydrogen to make hexamethylene diamine which, in turn, is reacted with adipic acid to make hexamethylene diammonium adipate, the nylon 6/6 salt.

Nylon 610 salt is made in a manner similar to that for nylon 6/6, except that sebacic acid is used in place of adipic acid. Nylon 6 is made from caprolactam. Nylon 610 is used for making bristles for brushes and similar uses where resistance to moisture is important. Nylon 6 and nylon 6/6 are competitive materials used in clothing, carpets, tire cords and industrial fibres.

The more important raw materials are noted below; these are dealt with in this report under the appropriate B.T.N. headings.

<u>Principal Raw Material</u>	<u>Intermediates</u>	<u>B.T.N. No.</u>
<u>Nylon 6/6 Intermediates</u>		
cyclohexane + air	cyclohexanol-cyclohexanone mixture	38.19
nitric acid	adipic acid	29.15
ammonia	adiponitrile	29.27
hydrogen	hexamethylene diamine	29.22
adipic acid and hexa- methylen diamine	hexamethylene diammonium adipate (nylon 6/6 salt)	29.22
<u>Nylon 6 Intermediates</u>		
cyclohexane + air	cyclohexanol-cyclohexanone mixture	38.19
cyclohexanone	caprolactam	29.35
<u>Nylon 610 Intermediates</u>		
cyclohexane + air	cyclohexanol-cyclohexanone mixture	38.19
nitric acid	adipic acid	29.15
ammonia	adiponitrile	29.27
hydrogen	hexamethylene diamine	29.22
sebacic acid and hexa- methylen diamine	hexamethylene diammonium sebacate (nylon 610 salt)	29.22

Although the chemicals referred to as "Intermediates" are dealt with as separate products under different headings, their use is almost exclusively in the production of nylon and there are, therefore, common considerations. These common considerations affected the tariff proposals which are presented under this heading following the product information on hexamethylene diamine, hexamethylene diammonium adipate and hexamethylene diammonium sebacate, the nylon intermediates and salts of heading 29.22.

Two chemicals of heading 29.22, hexamethylene diammonium adipate and hexamethylene diammonium sebacate, are respectively, the salts of nylon 6/6 and nylon 610; these are polymerized to the respective resins. One chemical of heading 29.22, hexamethylene diamine, is an intermediate, one process removed from the two salts; it is presented first below.

Hexamethylene Diamine

Hexamethylene diamine is a white crystalline solid made by reacting adiponitrile with hydrogen. It is made at Maitland, Ontario, by Du Pont of Canada Limited and used captively by this company in making nylon 6/6 salt. There are no other uses in Canada; as a result, no public information on production, use and prices is available. At the time of the hearing, Du Pont, the only manufacturer of nylon in Canada, said with respect to the absence of imports: "Our objective is to always be in position to provide our full requirements. It is more profitable."⁽¹⁾ Hexamethylene diamine can be transported and stored fairly easily, and could be imported for use in the production of nylon. In 1962, at the time of the hearing, a spokesman for Du Pont of Canada stated that he believed there were no imports, and the company was said to be using all of its production for nylon, thus precluding exports of hexamethylene diamine. However, import data were published in 1964, at which time 3.4 million pounds were imported, valued at \$1.8 million, an average value of about 52 cents per pound. All imports were from the U.S.A. and all were duty-free, undoubtedly under tariff item 923. However, in 1965 there apparently were no imports.

Hexamethylene diamine is mentioned specifically in tariff item 923, under which it may be imported free of duty when for use in the manufacture of synthetic resins. That probably would be the operative item if there were imports. More generally, it is dutiable under item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. Du Pont of Canada made the only proposal before the Board on this chemical, recommending rates of 25 p.c., B.P. and 30 p.c., M.F.N. The arguments in favour of these rates are those presented below for nylon intermediates.

Hexamethylene Diammonium Adipate

Hexamethylene diammonium adipate is nylon 6/6 salt. It is a white crystalline solid made by reacting hexamethylene diamine and adipic acid. At the time of the hearing, Du Pont of Canada Limited was the only manufacturer in Canada; it uses the product captively in the manufacture of the nylon resin at Kingston, Ontario. The salt has no other known use. Although there are no known imports, it was said to have entered the international trade of other countries because it can be transported and stored readily either dry or in solution.

(1) Transcript, Vol. 68, p. 10302

This chemical is named in tariff item 923, under which it may be imported free of duty when for use in the manufacture of synthetic resins; item 923 probably would be the operative item if there were imports. More generally it is subject to rates of 15 p.c., B.P. and 20 p.c., M.F.N. under tariff item 711.

Du Pont of Canada made the only presentation to the Board concerning hexamethylene diammonium adipate, recommending, as for other nylon intermediates, rates of 25 p.c., B.P. and 30 p.c., M.F.N. The company's proposal was supported by the general arguments presented below.

Hexamethylene Diammonium Sebacate

This product is made in the same manner as hexamethylene diammonium adipate except that sebacic acid is used instead of adipic acid. It is nylon 610 salt, but is not made in Canada, nor is it used here. The polymer however is imported and used in Canada in special applications, for example in monofilaments for brush bristles where resistance to water is important. Hexamethylene diammonium sebacate is named in tariff item 923 and may be entered free of duty when for use in making synthetic resins. Du Pont of Canada made the only submission concerning this chemical and recommended rates of 25 p.c., B.P. and 30 p.c., M.F.N. The company stated, at a later hearing, that if these rates were imposed, the company would make nylon 610 salt and polymer, using its own production of hexamethylene diamine and importing sebacic acid.⁽¹⁾

General Tariff Considerations for Nylon Intermediates

It is of prime importance to recognize the position of companies concerned with the manufacture of nylon both at the time of the hearing in 1962 and subsequently. In 1962, only Du Pont of Canada Limited made nylon in Canada. By 1965 or 1966 there are likely to be four companies making two kinds of nylon filament and fibres. These are:

<u>Company</u>	<u>Nylon type</u>
Du Pont of Canada Limited	nylon 6/6
Millhaven Fibres Limited	nylon 6/6
Courtaulds Canada Synthetic Fibres Limited	nylon 6
Union Carbide Canada Limited	nylon 6

As has been noted above, Millhaven Fibres produces nylon 6/6 for which it could obtain either the salt or hexamethylene diamine from Du Pont of Canada or from abroad. Courtaulds imports nylon 6 polymer and Union Carbide expects to make at least part of its requirements of nylon 6 polymer from the imported monomer, caprolactam.

⁽¹⁾ Transcript, Vol. 131, p. 19616

The heart of Du Pont's proposal was that encouragement should be given to the manufacture of all nylon intermediate chemicals in Canada; imports of chemical intermediates used in the manufacture of nylon should be discouraged. The company contended that other companies proposing to make nylon could either purchase their requirements of the salts from Du Pont or make them in Canada. Until 1962, Du Pont's position in the manufacture of nylon was protected by patents but, with the expiration of patent rights, the company wanted the shelter afforded by rates of duty high enough to discourage imports. Its spokesman said that, even without the protection afforded the company by patent rights, it would have been difficult before 1960 or 1961 for a competitor to establish an operation in this country because of the short supply of intermediates and polymers. In contrast he predicted that:

"in the future I think there are going to be people selling raw materials trying to encourage other people to put plants in here so that they will use them. There is that difference in emphasis which is coming about."(1)

Du Pont was apprehensive about a growing world over-supply of materials for making nylon, singling out European and Japanese production as sources of imports, but not excluding the United States.(2)

Du Pont stated that its costs are higher than those of producers in other countries, taking account of estimated allowances for scale, wage rates and costs of raw materials; the spokesman noted:

"I must admit that the case is based on our estimates of what we think the situation is in other countries because — first-hand information is not available, but we have given a good deal of study to these estimates and we think they are reasonable..."(3)

The difference between Canadian costs and the estimated costs of foreign producers was calculated by the company to be even more than the rates of duty of 25 p.c., B.P., 30 p.c., M.F.N. recommended by it.

In discussing the effect of the proposed increased tariff rates on prices, Du Pont said that consumers of nylon would not be faced with higher prices because the amount charged is "determined by competitive conditions and the existing tariffs on the fibre."(4) It was admitted, however, that the consumer might not receive the advantage of lower prices resulting from foreign price reductions on intermediates imported by other Canadian spinners. The Du Pont brief also noted that it is in the national interest to encourage industries that make the optimum use of resources, and argued that the manufacture of nylon intermediates contributes more to national product than many other pursuits. Finally, the company's brief said:

(1) Transcript, Vol. 64, p. 9581

(2) Same, Vol. 64, p. 9588, 9570

(3) Same, Vol. 64, p. 9563

(4) Same, Vol. 64, p. 9620

"The rates proposed in this submission are designed to help assure that Canada's requirements of nylon intermediates will continue to be produced by the Canadian chemical industry rather than to raise prices. The specific objective of the recommendations is to close the loophole that now exists in the tariff structure, whereby the duties on the end products can be circumvented, at least in part, by the installation of spinning facilities to produce nylon products from imported duty-free intermediates."(1)

The company would not actively encourage other companies to spin nylon but if they were determined to do so Du Pont would "make every effort to try and reach an agreement whereby we could supply them with the intermediates."(2)

Courtaulds Canada Synthetic Fibres Limited and Union Carbide Canada Limited did not submit proposals to the Board on nylon intermediates at the time of the hearing. Subsequently, however, in statements which were distributed by the Board to other interested parties, these companies presented briefs dealing with some of the points raised by Du Pont having to do with caprolactam and polycaprolactam for the manufacture of nylon 6. Courtaulds' brief said:

"As a general principle it can be stated, however, that we are in favour of the use of tariffs to foster Canadian production but we do not believe that tariffs should be used to preempt the market for the incumbent producer. Neither do we believe that tariffs should be used to discourage the introduction and development of new products and technologies even though they may be competitive with existing Canadian production."(3)

Courtaulds proposed that caprolactam in both the monomer and polymer form should be free of duty under the B.P. and M.F.N. Tariffs "until such time as Canadian production is available, at which time we would not of course object to the imposition of rates of duty reasonable in relation to those of the fibres and yarns manufactured therefrom."(4) Regarding Du Pont's contention that there is not room in the Canadian market for two nylon producers of optimum size, Courtaulds noted that its product will supplant a large part of the imported nylon 6 yarn and that the company expects to share in the growth of the market. The company's brief stated that it would not be economically feasible to start a fully integrated nylon production in Canada under today's conditions. With respect to costs of production, Courtaulds deduced that Du Pont's unit costs of production of intermediates must be low; otherwise the integration undertaken by that company would not have been economic.

The brief noted that there are synthetic fibres other than nylon 6 in competition with nylon 6/6, saying:

(1) Transcript, Vol. 64, p. 9566

(2) Same, Vol. 64, p. 9568

(3) Submission by Courtaulds Synthetic Fibres Limited to the Tariff Board Regarding the Tariff Treatment Appropriate to Raw Materials for the Production of Nylon 6 Fibres and Yarns, February 11, 1964, p.1

(4) Same, p. 2

"Finally, Du Pont advocates the duty free entry of raw materials for the manufacture of acrylic fibres on the grounds that volume was not sufficient to support the economic production of acrylonitrile in Canada; an argument equally applicable to nylon 6 raw materials."(1)

Courtaulds contended that the rates of duty proposed by Du Pont were "designed as much to offset potential competition due to technological developments as to equate the cost of efficient Canadian production with the cost of similar production abroad," and claimed that the suggested duties would effectively preclude the establishment of a second producer of nylon fibres and yarns in Canada.

Union Carbide Canada Limited, in its brief, said that it agreed generally with the views expressed by Courtaulds. The principal argument made by this company was that Du Pont's proposals go back too far in the production process in their concern about competitiveness; while polycaprolactam is competitive with nylon 6/6, caprolactam is not in direct competition with any material used in making nylon 6/6.

"Union Carbide has subscribed to the principle that goods made in Canada or which compete directly with goods made in Canada should have tariff protection of 15 per cent B.P. and 20 per cent M.F.N. It does not appear reasonable however that because two products compete directly that all raw materials entering into their manufacture and, in turn, into the manufacture of the raw materials ad infinitum should be considered as competing."(2)

Because Du Pont has an investment in facilities for making nylon and its intermediates, Union Carbide proposed a rate of 5 p.c., under both B.P. and M.F.N. Tariffs. This would give a measure of protection to Du Pont and at the same time encourage monomer production as soon as the market justifies it.

In reply to Union Carbide's proposal for a rate of duty of 5 per cent, Courtaulds reiterated its recommendation for a duty-free status for caprolactam, saying that it could "see no justification whatsoever for a 5% rate of duty on caprolactam monomer while it is not produced in Canada."(3)

Du Pont of Canada Limited replied to the briefs of Courtaulds and Union Carbide in a further brief to the Board. Du Pont maintained that any loss of sales of nylon 6/6 yarn to the producers of nylon 6 must affect the economies of scale adversely and could move costs "back towards a higher position on the cost curve." With reference to Courtaulds' statement that its production of nylon would supplant some

(1) Submission by Courtaulds Synthetic Fibres Limited to the Tariff Board Regarding the Tariff Treatment Appropriate to Raw Materials for the Production of Nylon 6 Fibres and Yarns, February 11, 1964, p. 4

(2) Submission by Union Carbide Canada Limited to the Tariff Board Regarding the Tariff Treatment of Caprolactam and Polycaprolactam, May 25, 1964, p. 2

(3) Commentary on the Submission by Union Carbide Canada Limited Regarding the Rate of Duty Appropriate to Caprolactam and Polycaprolactam, June 26, 1964, p. 2

imports, Du Pont maintained that Courtaulds' announced capacity "is three times the imports of nylon yarn for 1963..." In addition, Du Pont denied that its proposals had anything to do with inhibiting gains resulting from technological progress and said "we would like to reiterate that we know of no actual or potential technological advances with respect to nylon 6 which would cause us to alter our statements made before the Board." (1)

Dealing with Union Carbide's proposal not to apply tariffs to raw materials some distance back in the production chain, Du Pont stated:

"It is difficult, indeed, to support the logic of a proposal that would leave most stages in the production of nylon intermediates unprotected, and make the final one subject to tariff treatment." (2)

Canadian Industries Limited is interested in nylon 6/6 through the company's participation in Millhaven Fibres Limited, a producer of yarns and fibres, and CEL-CIL Fibres Limited, the marketing company for these fibres. Both of these companies were incorporated after the public hearings. C.I.L. did not participate directly in the discussion of rates of duty on the intermediates or on nylon resin; it did, however, propose rates of 15 p.c., B.P., 20 p.c., M.F.N. for products of B.T.N. heading 39.01; this general proposal would include the nylon resins. (3)

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- (1) A Reply by Du Pont of Canada Limited to the Submissions of Courtaulds Canada Synthetic Fibres Limited and Union Carbide Canada Limited to the Tariff Board on Caprolactam and Polycaprolactam, December 14, 1964, p. 4
 (2) Same, p. 5
 (3) Transcript, Vol. 132, p. 19737-8

SINGLE OR COMPLEX OXYGEN-FUNCTION AMINO-COMPOUNDS-B.T.N. 29.23

The chemicals of this heading have molecules containing an amine group and one or more of the oxygen-function organic radicals of previous headings relating to alcohols, phenols, ethers, aldehydes, ketones and acids. The Explanatory Notes to the Brussels Nomenclature divides the heading into five parts as follows:

- a) Amino-alcohols such as ethanolamine, diethanolamine and triethanolamine
- b) Amino-phenols such as ortho-, meta-, and para-aminophenol
- c) Amino-naphthols such as 7-amino-1-naphthol-3-sulphonic acid
- d) Amino-aldehydes, Amino-ketones and Amino-quinones such as aminobenzaldehyde
- e) Amino-acids such as glycine and sarcosine

In relation to the value of shipments of B.T.N. Chapter 29 as a whole, these chemicals, known shipments of which were valued at about \$3 million in 1962, represent only about 2 per cent of the total. Sodium glutamate and the ethanolamines are of greatest importance.

Sodium Glutamate

Sodium glutamate is made in Canada by Industrial Grain Products Limited, a subsidiary of The Ogilvie Flour Mills Company Limited. At Fort William, Ontario, flour is processed to yield starch and gluten; most of the gluten is shipped to the company's plant at Montreal, Quebec, where it is used in making glutamic acid and sodium glutamate. With respect to the economies of the operation, the company noted that "gluten must return almost the same dollar sales as starch per 100 pounds of flour processed, or the process is not economically feasible."⁽¹⁾ At the time of the hearing, this company's plant was the only one in Canada producing sodium glutamate and the company expressed the opinion that its process was as efficient as any other in use.

Sodium glutamate is used to enhance the flavour of soups and other foods. Manufacturers of canned and dehydrated soups were said to represent over 50 per cent of the market. Sales directly to household consumers, in one-ounce packages "represent 15 per cent, by weight, of the Canadian market and practically all of this is accounted for by the brand name product of the major United States producer of sodium glutamate."⁽²⁾

Imports of sodium glutamate have increased substantially in recent years. In 1964, they were 3.4 million pounds, valued at nearly \$1.8 million. The average value of imports has been declining and in 1964, at 52 cents per pound, it was only approximately one-half

⁽¹⁾ Transcript, Vol. 69, p. 10501

⁽²⁾ Same, Vol. 69, p. 10505

of the average value per pound of 1958. Although the U.S.A. continues to be the principal source of supply, Japan and Taiwan have become important countries of shipment, and imports, in smaller quantities, are received from many other countries.

Imports of Sodium Glutamate,
1958-64

<u>Year</u>	<u>'000 lb.</u>	<u>\$ '000</u>	<u>\$/lb.</u>
1958	652	661	1.01
1959	639	604	.95
1960	1320	1120	.85
1961	1155	1005	.87
1962	1186	922	.78
1963	2231	1289	.58
1964	3374	1761	.52

Japan, the United States and some European countries were said to be major producers against which Industrial Grain Products found it difficult to compete. The Board was advised that producers in these countries are subsidized, that they use, as raw materials, waste from such industries as sugar-beet refining, and that they ship to an intermediate country to export the product to Canada at prices that were actually, if not legally, dump prices. On the other hand, the spokesman for Campbell's Soup, Canadian Cannery and H. J. Heinz suggested that the reason foreign producers are able to compete favourably in Canada is that they make sodium glutamate by a fermentation process which is more economic than the process used by Industrial Grain Products. This company denied that its process is obsolete, contending that it would not be economic to build a plant in Canada to use the newer process.

Prices were shown to be about the same in Canada as in the United States, where the published price was 62 cents per pound in 1964, a decline from \$1.07 a pound in 1958. Industrial Grain Products did not anticipate an increase in prices under the proposed higher tariff rate but said that, if they did rise, the increase would amount to about 8 cents per pound, about 10 per cent at the then prevailing selling price, and would add significantly to costs at the consumer level.

Sodium glutamate and the glutamic acid from which it is made are currently entered into Canada under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. The manufacturer proposed rates of 25 p.c., B.P. and 30 p.c., M.F.N. in order to direct a larger share of the market to Canadian production. The domestic producer at the time of the hearing apparently had about 85 per cent of the total market, but had been unable to gain the retail market. No other proposal was made.

Ethanolamines

The three ethanolamines, mono-, di-, and tri-, are made in Canada by Dow Chemical of Canada Limited at Sarnia, Ontario and Fort Saskatchewan, Alberta, and by Union Carbide Canada Limited at Montreal, Quebec. Canadian Aniline and Extract Limited makes triethanolamine at Hamilton, Ontario. The three are co-products and, while the proportions in which they are produced may be varied somewhat, only triethanolamine can be produced by itself. Productive capacity in Canada was said to be adequate to satisfy domestic demand and to yield products for export.

About 70 per cent of the monoethanolamine consumed in Canada is used in purifying natural and refinery gas; some 25 per cent goes into soaps and detergents and the balance into miscellaneous uses. The roles are reversed for diethanolamine, about 82 per cent going into soaps and detergents and 13 per cent into purifying natural and refinery gas. Triethanolamine is used primarily as a corrosion inhibitor and as an emulsifier in specialty chemicals.

Imports of ethanolamine in 1964 were 308,000 pounds valued at \$114,000, all from the U.S.A. Dow Chemical stated at the hearing that imports of monoethanolamine had represented some 10 to 15 per cent of the total market in Canada, suggesting a market of about \$2 million at that time. Imports of diethanolamine and triethanolamine were said to be small. Prices were reported to range from 27 cents per pound to 29 cents in tank car lots, the lower prices being applicable in Ontario and Quebec and the higher in British Columbia. Union Carbide's brief noted that its comparable published price in the U.S.A. is 25 cents per pound; imports generally come from the United States. A small amount is exported, mainly to Commonwealth countries.

Imports of Ethanolamines, 1959-64

<u>Year</u>	<u>Mono-</u>	<u>Di-</u> \$'000	<u>Tri-</u>	<u>Total</u>
1959	440	250	32	722
1960	115	20	42	177
1961	160	-	41	201
1962	..	..	..	165
1963	..	..	..	200
1964	..	..	..	114

Source: Department of Industry, Chemical Import Trends; D.B.S., Trade of Canada, Imports for 1964

The two companies making presentations before the Board on ethanolamines, Dow Chemical of Canada Limited and Union Carbide Canada Limited, proposed rates of 15 p.c., B.P. and 20 p.c., M.F.N. These are the rates at which most of it is currently entered under tariff item 711, although monoethanolamine is also entered free of duty under items 791 and 851 when for agricultural or synthetic rubber uses. Union Carbide suggested that the small volume of imports indicates that

the current rates of duty have provided the domestic manufacturers with adequate protection.(1)

Polymer Corporation Limited included monoethanolamine among the chemicals of which it said, "we consider it essential the tariff provisions in respect of materials for use in the manufacture of synthetic rubber, now contained in Item 851, be continued ..."(2) Ethanolamine and triethanolamine were included, as noted below, as chemicals of lesser importance by the Canadian Pharmaceutical Manufacturers Association.

Other Chemicals of B.T.N. 29.23

The Canadian Pharmaceutical Manufacturers Association submitted a list of chemicals used by its members in the manufacture of pharmaceutical products and recommended that some end-use treatment be adopted for these chemicals. The Association recommended that rates of Free, B.P. and 15 p.c., M.F.N. should apply when the chemicals are not made in Canada and used in the manufacture of pharmaceuticals, and that rates of 15 p.c., B.P. and 20 p.c., M.F.N. should apply when they are made in Canada. All are dutiable under item 208t at rates of Free, B.P., 15 p.c., M.F.N. with the exception of glycine, L-lysine and b-Alanine, dutiable as acids, at the same rates, under item 216, and aluminum glycinate and triethanolamine, dutiable at 15 p.c., B.P., 20 p.c., M.F.N., under tariff item 711; triethanolamine may be imported free of duty under item 791 when for the manufacture of pesticides. The list of chemicals in the present heading to which this applies, with the more important chemicals identified by an asterisk, is as follows:

3-Aminocyclohexanol
Benzocaine* (ethyl p-aminobenzoate)
Butacaine
Butacaine sulphate
isoButyl p-aminobenzoate
Ethanolamine
Ethylenediaminetetra-acetic acid
Glutamic acid hydrochloride *
Glycine * (aminoacetic acid)
L-Lysine
L-Lysine dihydrochloride
Magnesium aspartate *
Methadone
Methadone hydrochloride
Methoxamine hydrochloride *
Methoxyphenamine hydrochloride *
Orphenadrine dihydrogen citrate
Orphenadrine hydrochloride
p-Phenetidine
Phenylephrine hydrochloride *
Potassium aspartate *
Procaine base

(1) Transcript, Vol. 69, p. 10477, 10480, 10484

(2) Same, Vol. 68, p. 10420

Procaine hydrochloride *
 Sodium 4-aminosalicylate
 monoSodium ethylenediaminetetra-acetate
 Sodium hydrogen glutamate
 Triethanolamine
 Triethanolamine O O' O" - trinitrate
 b-Alanine
 n-Acetyl-p-aminophenol
 Aluminum glycinate
 Butesin picrate
 Butyn base
 n-Butylamino benzoate
 Carbetapentane *
 3-diethylamino-2,2 dimethyl-1-propanol phosphate *
 4-(2-dimethylaminoethoxy)-N-(3,4,5-trimethoxybenzoyl)
 benzylamine hydrochloride *
 dl-Serine *
 Trimethobenzamide HCl
 Glucosamine *
 Isoproterenol sulphate
 Nilidrine
 Phenoxybenzamine HCl
 Phenyltoloxamine citrate
 Pseudo-ephedrine HCl *
 Sod.p-amino salicylate *
 Thioridazine hydrochloride
 Valethamate bromide

Phenylephrine hydrochloride, noted above in the Association's brief, was also mentioned by Merck Sharp and Dohme of Canada Limited which apparently uses it in pharmaceutical products. The company suggested that the current duty under tariff item 208t, Free, B.P. and 15 p.c., M.F.N., should remain until "a substantial portion of Canadian requirements are made in Canada."⁽¹⁾ Smith, Kline and French Inter-American Corporation also drew attention to the company's interest in this product, and proposed rates of Free, B.P., 15 p.c., M.F.N. for it.⁽²⁾

The Canadian Color Makers Association submitted a proposal on the following three chemicals which the Association said are not made in Canada and for which there are no Canadian made substitutes. They are used in the production of coloured pigments, and imports come from West Germany and the United States. Imports are entered free of duty under end-use item 203f and the Association requested that duty-free entry be continued.⁽³⁾ The three chemicals are as follows:

m-nitro-o-anisidine
 m-nitro-p-anisidine
 dianisidine

(1) Transcript, Vol. 68, p. 10364

(2) Same, Vol. 68, p. 10417

(3) Same, Vol. 68, p. 10381

The Primary Textiles Institute noted that its interest in these chemicals is identical with that of the Color Makers.

Electric Reduction Company of Canada Limited proposed that the tariff rates on triethanolamine phosphate be changed from Free, B.P., 25 p.c., M.F.N., under tariff item 218, to 15 p.c., B.P. and 20 p.c., M.F.N. Although the product could be manufactured by the company at Buckingham, Quebec, it is not. It is used by the paint and varnish industry to reduce corrosion in cans and as an anti-corrosion chemical by the producers of anti-freeze compounds. The medicinal grade is dutiable at Free, B.P., 15 p.c., M.F.N. under tariff item 208t.

Concerning carbetapentane and glucosamine, Pfizer Canada Limited took the position "that no useful purpose would be served by imposing duties on chemicals of a 'class not made in Canada' which the Company uses in its operations or which it imports for resale."⁽¹⁾ These chemicals are currently imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. The company recommended that these rates remain until the chemicals are made in this country.

Monsanto Canada Limited noted that p-phenetidine is not made in Canada and is imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N., subject to possible duty-free entry under end-use items such as item 851. Imports from the U.S.A., Germany and the U.K. amounted to about \$500,000 in 1963. It is used in pharmaceuticals and as an antioxidant in the manufacture of rubber. The company recommended free entry for this chemical until it is made in Canada. Naugatuck Chemicals Division of Dominion Rubber Limited noted its use of p-phenetidine as a raw material for rubber and agricultural chemicals. The company stated that it took no exception to the rates proposed by the producers of these materials, providing that the Board recommends those rates which will be proposed for the products it manufactures.⁽²⁾

The Canadian Manufacturers of Chemical Specialties Association submitted a brief on diethylaminoethanol which is not made in Canada but is used in making self-polishing floor waxes. Currently it is imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N.; the Association proposed that it be imported free of duty until made in Canada.

Benzocaine and magnesium aspartate have been noted in connection with the brief of the Pharmaceutical Manufacturers Association. They were included, also, in a presentation by John Wyeth and Brother (Canada) Limited, along with potassium aspartate. The company said that, since there is no Canadian manufacture of these chemicals, "an increase in duty rates would serve only to increase the costs and selling prices of those Canadian industries who must use these chemicals in their Canadian operations."⁽³⁾ They are currently imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. and the company proposed that there be no increase until a substantial portion of Canadian requirements is available from Canadian production.

(1) Transcript, Vol. 68, p. 10428

(2) Same, Vol. 69, p. 10624

(3) Same, Vol. 69, p. 10599

Hart Products Company of Canada Limited submitted a brief on the chemicals listed below and known generally as chelating agents, chemicals which prevent metallic ions from reacting with other products.⁽¹⁾ The total Canadian market is for about 1½ million pounds, valued at about \$500,000. Ninety per cent of this is said to be accounted for by ethylene diamine tetra acetic acid and its sodium salts, used by the pulp and paper industry. Imports of this acid and its salts were first reported separately in 1963 and amounted to \$55,000, indicating that a substantial portion of the market is served by products made in Canada.

Ethylene diamine tetra acetic acid and its sodium salts have been ruled made in Canada and are dutiable under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. Hart Products recommended that the rates of duty remain unchanged. Regarding this acid, the Canadian Pulp and Paper Association noted its use in bleaching ground-wood pulp and reiterated its opposition to any revision of the Tariff which would result in any increase over current tariff rates in respect of chemicals used by the pulp and paper industry.

The other chemicals in the list currently are dutiable at rates of Free, B.P. and 15 p.c., M.F.N. under tariff item 208t or 216. The remainder may be entered at the same rates of duty under item 208t. For all of these chemicals the company requested rates of 15 p.c., B.P. and 20 p.c., M.F.N.

The chemicals mentioned in the company's brief are as follows; those marked with an asterisk are made in Canada in commercial quantities; the others could be if a sufficient market were to develop.

- * ethylene diamine tetra acetic acid
- * disodium ethylene diamine tetra acetic acid
- * trisodium ethylene diamine tetra acetic acid
- * tetrasodium ethylene diamine tetra acetic acid

- diethylenetriamine pentacetic acid
- disodium diethylenetriamine pentacetic acid
- trisodium diethylenetriamine pentacetic acid
- tetrasodium diethylenetriamine pentacetic acid
- * pentasodium diethylenetriamine pentacetic acid

- * disodium dihydroxy ethyl glycine

- hydroxyethylethylene diamine triacetic acid
- * trisodium hydroxyethylethylene diamine triacetic acid
- disodium hydroxyethylethylene diamine triacetic acid

- * disodium N (2 hydroxyethyl) aminoacetate

and the di and tri valent metal salts of the above, including sodium, potassium, iron, calcium, magnesium, copper, manganese, nickel, lead, cobalt, lithium, cadmium, zinc, etc.⁽²⁾

(1) Transcript, Vol. 69, p. 10604

(2) Same, Vol. 69, p. 10601

The Industry Committee expressed the opinion that all chemicals of commercial importance had been dealt with in submissions received by the Board. The Committee recommended that other chemicals of B.T.N. heading 29.23 be dutiable at the rates generally suggested for the heading, namely 15 p.c., B.P. and 20 p.c., M.F.N.

At the hearing on pesticides, in November 1962, a group of seven manufacturers of pesticides made a proposal concerning a list of biologically active materials for use in the manufacture of pesticide formulations. The companies were:

A.H. Howard Chemical Co. Ltd.	Orangeville, Ontario
Allied Chemical Services Ltd.	Calgary, Alberta
Chipman Chemicals Ltd.	Hamilton, Ontario
Gallowhur Chemicals Canada Ltd.	Lachine, Quebec
Manchester Products Ltd.	Galt, Ontario
Niagara Brand Chemicals	Burlington, Ontario
Green Cross Division	
Sherwin Williams Co. of Canada Ltd.	Montreal, Quebec

The companies proposed:

"The signatories of this brief share the view of the Chemical Industry Committee that, when a biologically active chemical, now on Appendix II, is made in Canada, it should become subject to the duty rates which have been recommended for the appropriate B.T.N. heading."(1)

The proposal was based on the belief that a duty on biologically active materials, not made in Canada, would increase the prices of pesticides to Canadian users without producing off-setting advantages for any segment of industry. The products under the present heading are:

Amino dichlorobenzoic acid
Phenylamino cadmium dilactate
2,4,5-Trichlorophenoxy propionic acid-triethanolamine salt

QUATERNARY AMMONIUM SALTS AND HYDROXIDES;
LECITHINS AND OTHER PHOSPHOAMINOLIPINS -B.T.N. 29.24

"A quaternary ammonium compound is an organic chemical which may be regarded as derived from ammonium hydroxide...or an ammonium salt (e.g. ammonium chloride...or ammonium acetate ...) when the four hydrogen atoms...attached to the nitrogen are replaced by four hydrocarbon radicals."(1)

Although many products classified by heading 29.24 were the subject of representations before the Board, few, individually, are of much commercial importance. Many of the products belong to two groups of chemicals which are closely related in their use in surface-active agents; these are by far of greatest commercial importance and are dealt with first below. Some of the other products gain importance as chemicals for pharmaceutical use. It seems unlikely that the total commercial value of Canadian consumption of products of heading 29.24 exceeds one million dollars annually.

Alkyl Benzyl Trialkyl Ammonium Chloride, and
Benzyl Trialkyl Ammonium Chloride

These two names represent two families of cationic surface-active agents. The alkyl group in the first can be dodecyl, nonyl, stearyl or octyl phenoxy and the benzyl group in the second can be made from any fatty acid having 12 to 22 carbon atoms, such as lauryl, stearyl, cetyl or ethyl. Similarly, the trialkyl group can be dimethyl, trimethyl or hydrogen trimethyl.(2) One family is made from a lauryl alcohol type base and the other from a dodecyl benzene type base. The variations of members are, therefore, very numerous, but functionally the members of each family are similar.

Hart Products Company of Canada Limited manufactures lauryl dimethyl benzyl ammonium chloride, and alkyl benzyl trialkyl ammonium chloride. Three other manufacturers of quaternary ammonium compounds were named in a joint submission on surface-active agents; these were:

Canadian Aniline and Extract Co. Ltd.
Chemical Developments of Canada Ltd., and
Clough Chemical Co. Ltd.(3)

Their products were not named. With Hart Products Company, these companies were reported, in 1961, to be producing twenty chemicals under B.T.N. 29.24 and to have offered them under some fifty trade names. Substitution between products of this heading was said to be limited to chemicals within the same family as defined above; substitution was generally not possible between chemicals of different families. In blends, these cationic surface-active agents were said to be neutral, behaving like non-ionic surfactants if mixed with non-ionics, and behaving like anionic surfactants if mixed anionics.

(1) Transcript, Vol. 69, p. 10613

(2) Same, Vol. 69, p. 10614-5

(3) Same, Vol. 44, p. 6544

Consumption data for the quaternary ammonium salts are not available, but the representative of Hart Products Company estimated a total market of about \$500,000 in 1959, and imports in that year, of "about \$190,000, mostly from the U.S.A."⁽¹⁾ Other published data for quaternary ammonium salts indicate imports as follows:

1958	\$160,000
1959	\$205,000
1960	\$350,000
1961	\$100,000

Source: Department of Trade and Commerce, Chemical Import Trends

Beginning in 1962, a different breakdown of import statistics for surfactant materials was introduced, and the series of quaternary ammonium salts, as such, no longer appears.

Canadian prices were reported to be in the general range of 50 to 60 cents a pound, the same as those of imports.

As germicides, these products are imported free of duty from both B.P. and M.F.N. countries, under tariff item 219a(2), which provides for non-alcoholic chemicals for disinfecting in packages exceeding three pounds each, gross weight; more generally, they are dutiable under tariff item 208t at rates of Free, B.P., 15 p.c., M.F.N. The Hart Products Company proposed rates of 15 p.c., B.P. and 20 p.c., M.F.N., in agreement with a proposal made jointly by Lever Brothers Limited and four other companies on surfactant intermediates of B.T.N., heading 29.03 and the surface-active agents and blended detergents of heading 34.02.⁽²⁾ Chemical Developments of Canada Limited supported this proposal.⁽³⁾ It was stated that U.S. manufacturers enjoy economies of scale and cost advantages resulting from their manufacture of the intermediate chemicals. The discussion of surface-active agents is presented under heading 34.02; it was argued by the producers that all surface-active agents should be regarded as of a kind made in Canada, or directly competitive, and that this level of protection was necessary having regard to the economic factors.

Benzyl Triethyl Ammonium Chloride

The representative of Naugatuck Chemicals Division of Dominion Rubber Company Limited stated that the company took no issue with the rates being proposed by the producers of materials used by Naugatuck Chemicals provided the Board also recommends the rates for the products which the company manufactures.⁽⁴⁾ Among the products listed as made by Naugatuck was benzyl triethyl ammonium chloride of heading 29.24, which is used in polyester resin formulations. Specific data were not submitted on benzyl triethyl ammonium chloride, which probably would fall within the broad category of products for which Hart Products Company proposed rates of 15 p.c., B.P., 20 p.c., M.F.N.

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- (1) Transcript, Vol. 69, p. 10615
 - (2) Same, Vol. 102, p. 15337
 - (3) Same, Vol. 69, p. 10622
 - (4) Same, Vol. 6, p. 900

Methacholine Chloride and Tricholine Citrate

John Wyeth and Brother (Canada) Limited submitted a brief on methacholine chloride and tricholine citrate used in the manufacture of pharmaceutical products. At the time of the hearing in January 1962, there was no Canadian manufacture of these chemicals. They are entered under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. The firm proposed that there be no increase in the rates until a substantial portion of Canadian requirements becomes available from Canadian production.⁽¹⁾

These two chemicals were also included in a list submitted by the Canadian Pharmaceutical Manufacturers Association of products used by members of the Association in the manufacture of pharmaceutical products. End-use treatment was recommended for these chemicals for this use. The Association proposed that rates of Free, B.P. and 15 p.c., M.F.N., should apply to products not made in Canada, and that the heading rates of 15 p.c., B.P. and 20 p.c., M.F.N., proposed by the Industry Committee apply when the products are made in Canada.⁽²⁾ Other chemicals in the present heading subject to this proposal, with the more important ones marked by an asterisk, are:

Acetylcholine chloride
Betaine
Cetylbenzylammonium chloride
Cetyltrimethylammonium bromide *
Choline bitartrate
Choline chloride *
Choline dihydrogen citrate
Choline hydrogen tartrate (choline bitartrate)
Domiphen bromide
Ethyl-dimethyl-3-hydroxy-phenol ammonium chloride
Lecithin
Methacholine chloride
Oxyphenonium bromide
Succinylcholine chloride *
Suxamethonium bromide
Tricholine chloride

Choline chloride was also named as an important ingredient for animal feeds. For this use it could be imported free of duty under tariff item 219h; this item is not part of Reference 120.

The only statistics available are very limited import data on seven of the above named compounds; these are based partly on estimates.

(1) Transcript, Vol. 69, p. 10625

(2) Same, Vol. 68, p. 10392; Vol. 87, p. 13289-316

Imports ofJan. 1 to June 30, 1960

\$

Acetyl cholinechloride	955
Betaine anhydrous	881
Choline chloride	67,801
Choline dihydrogen citrate	317
Choline bitartrate	2,462
Oxyphenonium bromide	1,397(a)
Succinyl choline chloride	17,421

(a) 1959 data

Source: Department of Trade and Commerce, Spotlight on Chemicals

In 1963, imports of

In 1963, imports of choline chloride were about \$235,000 and of succinyl choline chloride, about \$95,000.

Benzyl Diethyl (2:6-Xylyl-Carbamoyl Methyl)-Ammonium Benzoate

This substance, known as "Bitrex" is an alcohol denaturant imported from British preferential sources by MacFarlan Smith (Canada) Limited.

A late submission was made by the importer at the hearings on headings 29.35, 29.42, and 29.44.⁽¹⁾ It proposed the continuation of the present rates under item 208t (Free, B.P. and 15 p.c., M.F.N.) until the material is declared to be made in Canada.

With respect to the heading more generally, the following statement by Rohm and Haas Company of Canada, Limited, was referred to at the public hearing.⁽²⁾

"We wish to file our recommendation that all quaternary ammonium salts described by Heading B.T.N., 29.24 be accorded duty rates of 0% B.P. and 0% M.F.N. until such time as any of these products shall qualify for made-in-Canada distinction."

The firm was not represented, and no discussion arose. According to information received by the Board, this statement appears to refer specifically to Hyamine (choline chloride).

The Industry Committee expressed the view that all products which currently had commercial importance were dealt with in the submissions received by the Board for this hearing. The Committee recommended that other products receive tariff treatment of 15 p.c., B.P. and 20 p.c., M.F.N. under a general provision for the heading.

(1) Transcript, Vol. 78, p. 11995

(2) Same, Vol. 68, p. 10249

AMIDE-FUNCTION COMPOUNDS - B.T.N. 29.25

An amide is an organic chemical, which can be thought of as being derived from ammonia by the replacement of one or more of the hydrogen atoms with one or more acyl groups. The Explanatory Notes to the Brussels Nomenclature recognize three divisions in the heading:

- (A) Acyclic amides, among which are urea, acetamide and asparagine. The heading includes urea only when it contains, in the dry state, more than 45 per cent by weight of nitrogen; urea containing in the dry state 45 per cent or less by weight of nitrogen is allocated to B.T.N. Chapter 31, as a fertilizer material.
- (B) Cyclic amides, among which are diethyldiphenylurea, hydantoin, acetanilide and acetparaphenetide.
- (C) Acetoacetyl derivatives of cyclic amines; arylides and substituted arylides of hydroxynaphthoic acids.

Several products of commercial importance were discussed before the Board under heading 29.25. The one of outstanding significance is urea, used as a fertilizer, as an animal feed and for the manufacture of urea formaldehyde resins. Because, in the Canadian Tariff, no distinction is made on the basis of its nitrogen content, all forms of urea are dealt with in the report which follows.

Urea

Urea is a white crystalline solid resembling sugar in appearance. Also known as carbamide or carbonyldiamide, it is a natural product of the metabolism of warm-blooded animals. However, it is produced in commerce synthetically by the reaction of ammonia and carbon dioxide under controlled conditions of temperature and pressure.

Only three companies, Consolidated Mining and Smelting Company of Canada Limited, Cyanamid of Canada Limited and Sherritt Gordon Mines Limited, made urea at the time of the hearing in 1962.

Cyanamid of Canada Limited at Hamilton, Ontario obtains its raw materials, carbon dioxide, hydrogen and nitrogen, from the blast furnace gas of a nearby steel plant. Sherritt-Gordon Mines Limited produces ammonia at Fort Saskatchewan, Alberta; in this process large quantities of carbon dioxide are produced and ordinarily go to waste. The manufacture of urea from ammonia and carbon dioxide avoids this waste.

According to information contained in the brief presented to the Board by each of the three producers of urea in Canada, capacity to produce urea, in 1962, totalled about 144,000 tons per year. This has since been increased by the expansion of capacity in older plants and by the addition of new plants. Capacity in 1962 and anticipated capacity in 1966 are shown below.

Capacity of Canadian Plants to Produce Urea,
1962 and 1966

		Capacity - Tons per year	
		<u>1962</u>	<u>1966</u>
Brockville Chemicals Limited	Maitland, Ont.	-	50,000
Canadian Industries Limited	Sarnia, Ont.	-	(not dis- closed)
Consolidated Mining and Smelting Company of Canada Limited	Calgary, Alta.	36,000	90,000
Cyanamid of Canada Limited	Hamilton, Ont.	75,000	110,000
Sheritt-Gordon Mines Limited	Fort Saskatchewan, Alta.	33,000	100,000
Simplot Chemical Company Limited	Winnipeg, Man.	-	<u>30,000</u>
Total of above listed capacity		144,000	380,000

No production of urea was reported in Canada in 1959. Of an estimated total consumption of some 16,000 tons in the following year, Cyanamid said that it had supplied about 8,600 tons, including some for captive use; by 1961 this company said it supplied 16,000 tons of urea for domestic consumption; it was also exporting significant quantities. In the same year Consolidated Mining and Smelting produced 31,000 tons. Factory shipments were reported to have risen to approximately 170,000 tons in 1963 and 180,000 tons in 1964; these would have a value respectively of about \$14 million and \$15 million. By far the largest part of these shipments, as noted below, was for export. Thus, in the space of six or seven years, the production of urea for domestic use and export has grown from nothing to a value of the order of \$15 million a year, and plant capacity is being expanded to provide for further substantial increases in the production of urea. While there apparently is a growing demand for urea in all of its principal uses, the most impressive growth is for fertilizer, both domestically and in export sales.

Since urea is very soluble in water and can contain as much as 46.7 per cent nitrogen, it is especially suitable for use as a fertilizer. For this purpose it should flow freely from the machinery used to spread it, and therefore its naturally hygroscopic nature must be controlled by "prilling", a process involving the spraying of a concentrated solution of urea downward in a tower against a rising stream of dry air, and the subsequent coating of the resulting globules with clay. Although the fertilizer grade of urea was said to contain generally no more than 45 per cent by weight of nitrogen, the Board was told that:

"Today (January, 1962), fertilizer grade urea, 45 per cent nitrogen, is offered in eastern Canada at \$92 per ton ... and the same producer also offers fertilizer grade with 46 per cent nitrogen at a premium of \$2 per ton."(1)

An estimate of the supply and disposition of urea is given in the following table:

Approximate Supply and Disappearance of Urea 1962 - 1964			
	<u>1962</u>	<u>1963</u> - tons -	<u>1964</u>
Supply:			
Shipments	130,000	170,000	180,000
Imports	<u>1,873</u>	<u>1,802</u>	<u>5,000</u>
Total	131,873	171,802	185,000
Disappearance:			
Domestic Sale	26,500	33,100	..
Exports to U.S.A.	65,200	88,600	124,200
Other (mostly other export)(a)	40,173	50,102	..

(a) Derived residually from the other data

Urea is used in feeds for animals where it provides a convenient source of protein. Since, when it is used for this purpose, it commonly contains only 42 per cent nitrogen, this grade of urea would be classified in B.T.N. heading 31.02, with nitrogenous fertilizers, even though it is not to be used as a fertilizer. The Board was advised that 46 per cent nitrogen urea could be used as a feed but would probably encounter resistance from feed formulators. On the other hand, a spokesman for the Consolidated Mining and Smelting Company of Canada Limited said that, in British Columbia at the time of the hearing, prilled urea from Japan with a nitrogen content of 45 or 46 per cent was being used as a feed.

It seems, therefore, that the percentage of nitrogen contained in the urea is not a criterion of use in fertilizers or in feeds; urea in strengths both lower and higher than 45 per cent nitrogen can be used for either purpose.

Other important uses of urea are in synthetic resins, medicine, adhesives and explosives. Some 12,000 tons of urea were reported to be used in Canada in 1959, mostly in livestock feeds (which took about 39 per cent of this total), primary plastics (about 34 per cent) and fertilizers (about 12 per cent). The industrial distribution of 27,000 tons of urea consumed in 1963 was estimated as follows, compared to the quantities for 1959 and 1962. Information available to the Board indicates that captive use took only a small part of total production.

Consumption of Urea in Canada,
1959, 1962 and 1963

	1959		1962		1963	
	'000 tons	\$'000	'000 tons	\$'000	'000 tons	\$'000 ^(a)
Industrial chemicals	..	..	7.4	541	10.0	737
Cattle feeds	4.5	493	5.6	580	7.0	728
Plastics & synthetic resins	4.0	429	4.6	476	4.9	502
Fertilizers	1.4	131	2.4	214	2.8	255
Miscellaneous chemical products	0.2	25	1.7	230	1.4	191
Pulp and paper	..	..	0.9	95	0.8	90
Other	..	..	0.1	15	0.2	25
Total of above consumption	..	..	22.7	2,151	27.1	2,528

(a) 1963 values estimated by applying the 1962 average values to quantity for each group

Source: D.B.S., various publications

Not included in the data of the above table is the direct consumption of urea as fertilizer. Sales of urea for direct fertilizer use during selected crop years from 1959 to 1964 were:

Sales of Urea in Canada for Direct Application as a Fertilizer,
Selected Crop Years, 1959-64

	Tons
1959	132
1962	3,873
1963	5,857
1964	10,441

By far the larger portion of Canadian production of urea is destined for export markets. As noted above, total consumption of urea in Canada was about 33,000 tons in 1963, whereas exports to the U.S.A., as reported in U.S. import statistics, were over 88,000 tons in that year and 124,000 tons in 1964. In addition, there have been very substantial exports to other countries. These are reflected in the preceding table on Supply and Disappearance, but are not included in the data of the following table. The Consolidated Mining and Smelting Company of Canada Limited noted that "practically the entire production in 1961 was sold in export markets. A substantial portion was exported to the United States."⁽¹⁾ Imports were less than 5,000 tons in 1964, valued at \$563,000, almost entirely from the U.S.A.

⁽¹⁾ Transcript, Vol. 70, p. 10654

Imports and Exports of Urea,
1959-64

Year	Imports		Exports to U.S.A.	
	tons	\$'000	tons	\$'000
1959	4,173	387	3,200	329
1960	2,140	187	21,320	1,974
1961	1,297	88	37,380	3,314
1962	1,873	123	65,249	5,483
1963	1,802	110	88,588	6,906
1964	4,832	563	124,205	9,194

Source: Imports: 1964, D.B.S., Trade of Canada; 1959-1963, U.S.
Dept. of Commerce
Exports: U.S. Dept. of Commerce

The price of urea is not published in Canada. At the public hearing, however, the price of the industrial grade, in carload lots, f.o.b. plant, in 1962 was said to be \$120 per ton; of fertilizer grade, \$92 per ton and of feed grade, \$98 per ton. However, contract prices for large quantities would tend to reduce these prices somewhat, especially for the industrial grade and possibly for the fertilizer grade in other than the peak season of application. In 1962, published U.S. prices were \$100 per ton for an industrial grade, f.o.b. plant, 46 per cent nitrogen content; \$96 per ton for an agricultural grade, f.o.b. plant, 45 per cent nitrogen content and \$95 per ton, feed grade, f.o.b. plant, 42 per cent nitrogen. In 1963, the published prices were changed in that the feed grade was put on a delivered basis and the price increased from \$95 per ton, f.o.b. plant, to \$100 per ton, delivered. In addition, the agricultural grade in the U.S.A. has been quoted on a delivered basis since March 1963, with no change in list price, and the industrial has been quoted on a freight equalized basis since March 1964, with no change in list price. The prices in both countries, however, are understood to be subject to discounts depending upon volume of purchase and seasonal factors.

Tariff Considerations

In 1964, fewer than 5,000 tons of urea were imported into Canada, at a value of about \$563,000; in the two previous years, imports amounted to 1,800 tons, valued at about \$123,000 and \$110,000, respectively. By far the greater part came from the U.S.A., only a minor quantity was imported from West Germany. Imports in 1964 represented something over 10 per cent of Canadian consumption of urea, but a much smaller percentage of Canadian production.

The tariff items under which urea may be entered into Canada depend upon the use to which it is to be put. For use as a fertilizer in the condition in which it is imported, it is dutiable under tariff item 663 at rates of Free, B.P., 5 p.c., M.F.N. When it is to be used in the manufacture of fertilizer, it is duty-free under all Tariffs under item 663b. Tariff item 711, with rates of 15 p.c., B.P., 20 p.c.,

M.F.N., applies when urea is imported for other uses. Indications are that all the urea imported into Canada in 1964 was entered either under item 663 or item 663b.

It has been noted above that, in the Brussels Nomenclature, urea is classified not according to its use but according to its nitrogen content; in the B.T.N., only urea containing, on a dry basis, more than 45 per cent by weight of nitrogen is classified by heading 29.25. If it contains 45 per cent or less by weight of nitrogen it is classified with nitrogenous fertilizers in heading 31.02.

The three manufacturers of urea presented two different points of view to the Board. On the one hand, Cyanamid of Canada proposed that the rates of duty currently in effect remain unchanged and said in support of this view:

"It is respectfully requested that the present duty status remain unchanged. If a change is made in the rate for other than fertilizer uses, the Canadian market will be subject to pressure of material from Europe and Far East at times of excess production at distress or dump prices."(1)

In explanation of this proposal, the company said that the 5 per cent, M.F.N. rate applicable on urea for fertilizer use gives sufficient protection against dump prices; it noted that manufacturing in Canada needs some measure of protection.

The Consolidated Mining and Smelting Company and Sherritt-Gordon Mines Limited, on the other hand, recommended the elimination of differences in rates of duty and in classification based on end-use or on nitrogen content, and proposed free entry for urea of all grades and for all uses.

The Consolidated Mining and Smelting Company of Canada Limited made its proposal in these words:

"The company submits that there should be no differentiation in the classification of urea, irrespective of the end-use, whether it contains more or less than 45 per cent nitrogen, because urea sold as a fertilizer is not restricted to 45 per cent nitrogen. It is also sold as a fertilizer containing 46 per cent nitrogen.

"The company further submits that Canada's ability to compete in a free, competitive market for urea as well as for fertilizers as a whole is demonstrated by the fact that Canada exports in dollar value substantially more fertilizers than it imports, and that it is in Canada's interest to maintain free entry of its urea and other fertilizers into the United States by dropping the five per cent duty levied on imports into Canada."(2)

(1) Transcript, Vol. 70, p. 10636

(2) Same, Vol. 70, p. 10655

Sherritt-Gordon Mines Limited explained its position in the following words:

"We submit, for your consideration, the suggestion that there should be no differentiation in Canadian tariff classification between types or grades of urea and that urea should enter Canada free of duty under both B.P. and M.F.N. headings."(1)

One reason put forward for this proposal was its belief that if urea is dutiable on importation into Canada, there is the possibility of a reciprocal duty on exports from Canada to other countries.

As noted above, imports of urea have supplied only a small part of Canadian requirements and these apparently have been for fertilizer use. It is possible that the rates of duty under tariff item 711, namely 15 p.c., B.P., 20 p.c., M.F.N. have operated to restrict imports for uses which are not recipients of end-use privileges.

Naugatuck Chemicals Division of Dominion Rubber Company Limited noted its interest as a consumer of urea in processing rubber, and said:

"We take no issue with the rates which are being proposed to you by the producers of these materials, provided the Board also recommends those rates which will be proposed to you for the products which we manufacture."(2)

Urea containing in the dry state more than 45 per cent of nitrogen was included in a list of chemicals submitted to the Board by the Canadian Pharmaceutical Manufacturers Association, which recommended that some end-use treatment be adopted for chemicals used in the manufacture of pharmaceutical products. The Association recommended that rates of Free, B.P. and 15 p.c., M.F.N. apply when the chemicals are not made in Canada and that the heading rates of 15 p.c., B.P. and 20 p.c., M.F.N., proposed by the Industry Committee, apply when they are made in Canada. The Association, therefore, in effect was proposing rates of 15 p.c., B.P., 20 p.c., M.F.N. for urea.

Acrylamide

Acrylamide, not made in Canada, is an acrylic monomer obtained by the hydration of acrylonitrile with sulphuric acid, followed by neutralization. It is used in synthesizing dyes and, as polymers or copolymers, in synthetic resins, adhesives, paper sizes, textile sizes and soil conditioning agents. Used in heat-convertible acrylamide interpolymer resins, acrylamide is said to give to appliance enamels and to strip metal roll-coat finishes the properties of surface hardness, colour retention, mar resistance, stain and chemical resistance, and adhesion to chemically treated metals without priming.(3)

(1) Transcript, Vol. 70, p. 10663

(2) Same, Vol. 70, p. 10676

(3) Same, Vol. 70, p. 10677

Imports were valued at \$3,456 in the first six months of 1960, but in 1962 imports for the full year were valued at \$50,000.⁽¹⁾ The Canadian Paint Varnish and Lacquer Association said that the use of acrylamide will increase.

Imports are free of duty under tariff item 921, while the chemical is not made in Canada, for use in the manufacture of synthetic resins. More generally, imports would be entered under item 208t at rates of Free, B.P., 15 p.c., M.F.N. The Canadian Paint Varnish and Lacquer Association proposed that acrylamide should be entered free of duty. No other representations were heard, and no objection was raised to this proposal.

Urethane and Meproamate

Meproamate is a tranquillizing agent made in Canada from two principal imported materials, urethane and methyl pentanal (2-methylpentanaldehyde). Methyl pentanal is classified under B.T.N. heading 29.11. Urethane is also known as urethan or as ethyl carbamate, of B.T.N. heading 29.25. Imports of urethane, from 1956 to 1960, fluctuated in value between \$15,000 and \$100,000.

Fine Chemicals of Canada Limited stated that imports of urethane are from the United States, Denmark, Germany, or the United Kingdom.⁽²⁾ If imported exclusively for the manufacture of meproamate, the urethane enters duty-free under both B.P. and M.F.N. Tariffs under temporary tariff item 208y. For other purposes it is entered under item 208t at rates of Free, B.P. and 15 p.c., M.F.N. The company proposed that provision for free entry of urethane, when imported exclusively for the manufacture of meproamate, should be continued until such time as urethane is made in Canada. Urethane is included in the proposal by the Canadian Pharmaceutical Manufacturers Association dealt with toward the end of the submissions under this heading.

With reference to tariff item 208y, Fine Chemicals of Canada said:

"We strongly support the principle of duty-free entry into Canada of chemicals used as intermediates or reagents when they are not made in this country, for further chemical manufacture. The Canadian tariff provides the possibility of creating temporary new items which permit the duty-free importation of chemicals needed in the production of certain materials ... We consider this as one of the few methods available to the government to assist in fostering the chemical industry in Canada, which despite its size, is still a relative pioneer particularly in the fine organic field."⁽³⁾

(1) Dept. of Trade and Commerce, Spotlight on Chemicals; Dept. of Industry, Chemical Import Trends

(2) Transcript, Vol. 70, p. 10682

(3) Same, Vol. 70, p. 10683

Meprobamate imports were valued at \$12,758 and \$10,364 for the first six months of 1959 and 1960, respectively.

The Canadian Pharmaceutical Manufacturers Association and Charles E. Frosst and Company listed meprobamate as a raw material for pharmaceutical products, made in Canada, dutiable under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N., and proposed the continuation of these rates.⁽¹⁾

Salicylamide

Fine Chemicals of Canada Limited described salicylamide as a chemical made from the reaction of aqua ammonia and methyl salicylate and used in a pain-killer, fever suppressant and antirheumatic compound. It may be used in place of acetylsalicylic acid (A.S.A.) by patients who are sensitive to the latter.

The company said it was the only Canadian manufacturer of salicylamide at the time of the hearing (February 1962) and estimated annual Canadian requirements at 6,000 pounds believed to be mostly imported from Britain at that time.⁽²⁾ Imports of salicylamide in 1959 are estimated to have been valued at nearly \$4,000 and in 1960 at less than \$1,000. At the then prevailing U.S. price of \$1.05 per pound, these values would indicate imports of less than 4,000 pounds and less than 1,000 pounds, respectively in the two years. The U.S. price in September 1965 was \$1.12 per pound.

This chemical, if ruled made in Canada for Customs purposes, would be dutiable under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. The manufacturer at the time of the hearing in February 1962, proposed that these rates be retained; however, correspondence from Charles E. Frosst and Company in 1963 suggested that production of salicylamide had been discontinued in Canada and imports are classified under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. It is not now listed as made in Canada.

Phenacetin (Acetophenetidin)

Monsanto Canada Limited was the only Canadian producer of phenacetin at the time of the hearing (February 26, 1962). Phenacetin is a product of the reaction of para-phenetidin and acetic acid, and is used in pharmaceutical products for its pain-killing and temperature-lowering properties. It may be used alone or mixed with other chemicals, for example, acetylsalicylic acid, caffeine and codeine.

The value of imports showed increases from 1957 to 1962, followed by a slight decline in 1963, as indicated in the following table:

(1) Transcript, Vol. 70, p. 10763, 10765

(2) Same, Vol. 70, p. 10686

Imports of Acetophenetidin, 1956-63

<u>Year</u>	<u>\$'000</u>
1956	75
1957	15
1958	55
1959	135
1960	115
1961	130
1962	170
1963	165

Source: Dept. of Trade and Commerce, Dept. of Industry, Chemical
Import Trends

Published data on use for medicinal and pharmaceutical preparations show 257,000 pounds valued at \$210,000 in 1961 and 246,000 pounds valued at \$203,000 in 1962.

Monsanto Canada Limited, at the time of the hearing, said that its price, in ton lots, was 90 cents per pound; in less than ton lots, it was 92 cents per pound, less an allowance for distributors. The price of phenacetin in the U.S.A. in 1965 was published at \$1.10 per pound, in 200 pound drums, and \$1.12 per pound in 100 pound drums, both in 1,000 pound lots.⁽¹⁾

Phenacetin was dutiable at the time of the hearing under tariff item 711 at rates of 15 p.c., B.P., 20 p.c., M.F.N., and Monsanto Canada Limited requested the continuation of these rates. Phenacetin is no longer listed as made in Canada; correspondence from Charles E. Frosst and Company in 1963 indicated that production has been discontinued in Canada and that phenacetin is dutiable under item 208t at rates of Free, B.P. and 15 p.c., M.F.N. It is included in the proposal of the Canadian Pharmaceutical Manufacturers Association as noted later in this report.

Other Products of Heading 29.25

John Wyeth and Brother (Canada) Limited expressed interest in the following chemicals, used in the manufacture of pharmaceutical products:

Butabarbitoric Acid
Butabarbital Sodium
Oxethazaine
Phenobarbital
Secobarbital Sodium

Imports of barbituric acid, its salts and derivatives were estimated at about \$600,000 in 1960 and \$500,000 in 1962 and 1963.

⁽¹⁾ Oil, Paint and Drug Reporter

John Wyeth and Brother noted that none of these chemicals was made in Canada at the time of the hearing and all were dutiable at rates of Free, B.P. and 15 p.c., M.F.N., under tariff item 208t or 216. The company proposed that there be no increase in rates because there is no Canadian manufacture of these chemicals and an increase in rates of duty would only increase the costs and selling prices of Canadian users. Butabarbituric acid, oxethazaine and phenobarbital were listed as more important chemicals by the Canadian Pharmaceutical Manufacturers Association. The Association's proposals are dealt with later in this report.

Eight chemicals of this heading were named by the Canadian Color Makers Association as materials not made in Canada but imported for the manufacture of pigment dyestuffs:

<u>Name</u>	<u>Alternative Names</u>
Acetoacetanilide	(aceto-acetanilide)
Acetoacet-o-anisidide	(O-aceto acetanisidide), (aceto-acetic-O-anisitide)
Acetoacet-o-toluidide	(O-acetoacetotoluidide)
Acetoacet-o-chloranilide	(acetoacetanilide-O-chloro), or (aceto-acetic-O-chloro- anilide)
Beta-hydroxy-naphthoic-anilide	(b-oxynaphthoic anilide) (Naphthol AS)
Beta-hydroxy-naphthoic-m-nitranilide	(Naphthol AS-BS)
Beta-hydroxy-naphthoic-p-chlor- anilide	(Naphthol AS-E)
Beta-hydroxy-naphthoic-o-toluidide	(Naphthol AS-D)

The Color Makers Association submitted that neither these materials nor substitutes for them are made in Canada. They were said to be imported from West Germany, the United States and the United Kingdom.

When for use in the manufacture of coal tar dyes, imports of these chemicals are free of duty under tariff item 203f, and the Association recommended that they continue to be entered free of duty. At the hearing on this end-use item in October 1962, the Canadian Color Makers Association requested an end-use tariff item covering:

"Materials of a kind not made in Canada for use in the manufacture of synthetic pigments other than black or white pigments."(1)

The Association's intention was to replace a number of items in the existing Tariff, namely items 203b, 203c and 203f, none of which is qualified by a "made in Canada" criterion. It also stressed the importance of considering the above end-use proposal in conjunction with proposals on pigments and colours of headings 32.05, 32.06, 32.07 and 32.09, dealt with separately in this report.

(1) Transcript, Vol. 93, p. 14209

"If such an 'end-use' item, or its equivalent is not recommended, the Association would feel compelled to request higher rates of duty under Headings 32.05, 32.06, 32.07, and 32.09 to offset increased cost of raw materials." (1)

Halogenated carbanilides and halogenated salicylanilides were the subjects of a joint submission by Canada Packers Limited, Colgate-Palmolive Limited, Lever Brothers Limited and The Procter and Gamble Company of Canada, Limited. One example of each "family" was noted respectively as:

3,4,4'-trichlorocarbanilide (a halogenated carbanilide), and
3,5,4'-tribomosalicylanilide (a halogenated salicylanilide).

The two families were believed to contain a total of four or five products. (2)

It was stated that halogenated carbanilides and halogenated salicylanilides were not made in Canada, but were available from the U.S.A., United Kingdom, and Switzerland. 3,4,4'-trichlorocarbanilide is a colourless, heat-resistant, highly insoluble bacteriostat, useful in soaps and detergents. Both products were said to be used in low concentrations in the formulation of bar soaps, liquid soaps and detergents because of their lack of colour, their high potency at low concentrations, their continued inhibition of bacterial growth after washing, their compatibility with many product formulations and their non-poisonous, non-irritating properties. This combination of properties was said to belong to the two named chemicals and a small number of other members of the same families.

In spite of the low concentrations at which they are used, these chemicals were said to be costly, averaging about 10 per cent of the raw material cost of finished products, or about 2½ to 3 per cent of the selling price to the ultimate consumer. The four companies estimated imports at the time of the hearing to be about 100,000 pounds per year, valued at about \$200,000.

Imports of the halogenated carbanilides and salicylanilides are free of duty under tariff item 219a(ii). The four companies named above proposed that halogenated carbanilides and halogenated salicylanilides continue to be free of duty, until they are made in Canada. (3)
 No opposition was raised.

Six materials for use in surface active agents were named by Hart Products Company of Canada Limited as being made by the company in Canada and classified under heading 29.25. They are:

Lauric diethanolamide
 Lauric isopropanolamide
 Lauric monoethanolamide
 Coconut diethanolamide
 Coconut monoethanolamide
 Sodium methyl taurate (Sodium N-Methyl-N-Oleyl-Taurate) (4)

(1) Transcript, Vol. 93, p. 14211
 (2) Same, Vol. 70, p. 10710, 10714
 (3) Same, Vol. 70, p. 10713
 (4) Same, Vol. 70, p. 10723

However, the classification of coconut diethanolamide and coconut monoethanolamide was recognized as being properly as surface-active agents of B.T.N. 34.02, because the products are not single, chemically defined substances.

Canadian Aniline and Extract Co., Limited supported the Hart Products' brief with respect to the first five products, the lauric and coconut compounds.

All six products were said to be foam enhancers and stabilizers with some surface activity and cleansing ability, and were said to be used mainly by manufacturers of liquid and powdered detergents. The Hart Products' brief estimated Canadian consumption of this type of product to be 7 to 8 million pounds valued at \$2 million to \$2.5 million per year, with imports supplying perhaps 20 per cent of requirements. Competitive products, not now made in Canada, were named:

Oleic diethanolamide (B.T.N. 29.25)
 Oleic monoethanolamide (B.T.N. 29.25)
 Stearyl Diethanolamide (B.T.N. 29.25)
 Palm Kernel Oil Diethanolamide (B.T.N. 34.02).

These were said to be only examples of a wide range of foam stabilizers and it was suggested that at least some of them have, from time to time, been made in Canada.

Producers of foam stabilizers, in addition to Hart Products and Canadian Aniline and Extract Company, were said to include: Chemical Developments of Canada, Alkyl Chemicals, Toronto and E.F. Trew, Ajax, Ontario and perhaps one or two others.

Imports of foam stabilizers are not tabulated separately, but Hart Products estimated imports to be \$350,000 to \$400,000 per year, equal to about 1,500,000 pounds.⁽¹⁾

Hart Products expressed concern, not only with imports of the first six foam stabilizers, but with amides made from the lauric acid fraction of coconut oil:

"In the United Kingdom there has been a large market for the other coconut oil fractions such as myristic, and thus when the lauric acids pile up, the producers tend to lower their prices quite drastically to reduce their inventory of lauric acid, and thus are able at times to offer very attractive prices on all markets.

"One does not find generally large price reductions being offered by American suppliers. U.S. suppliers do, however, have advantages of obtaining their amines at cheaper prices..."⁽²⁾

(1) Transcript, Vol. 70, p. 10724

(2) Same, Vol. 70, p. 10725

Tariff item 711 with rates of 15 p.c., B.P. and 20 p.c., M.F.N. applies to most of the chemicals named in the brief. The substitute materials, not made in Canada, are dutiable under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. Hart Products Company of Canada Limited recommended that all the chemicals of B.T.N. heading 29.25 be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N., and that products of the type with which its brief was concerned be included under these heading rates. Canadian Aniline and Extract Company recommended the same rates for all chemicals of heading 29.25 and that "in addition to the chemicals specifically mentioned above, other products of this type be included under these heading rates."⁽¹⁾ It is not certain, however, that all of the substitutes would be separate, chemically defined compounds of heading 29.25; the possibility of substitutes not being subject to the proposal for heading 29.25 was not dealt with.

Colgate-Palmolive Limited submitted a brief on Sodium N-lauroyl sarcosinate, a detergent foaming agent used in formulating dental cream. No Canadian manufacturer of this substance was known at the time of the hearing. It was said to be available from European and U.S.A. sources, but the Canadian firm indicated that its sole source of supply was its parent company in the United States.⁽²⁾

The price for non-dentifrice grades was \$1.15 per pound in the U.S.A. In the opinion of the firm, no Canadian manufacturer would consider making sodium N-lauroyl sarcosinate for the limited Canadian market: no Canadian made substitutes were available at the time of the hearing, and in turn this substance was competitive with no made-in-Canada material. Sodium lauryl sulphate was named as the foaming agent in tooth pastes competitive with Colgate-Palmolive's but, for quality reasons, it was also imported.

Sodium N-lauroyl sarcosinate is dutiable under item 208t at rates of Free, B.P. and 15 p.c., M.F.N. The company proposed that it be admitted free of duty until made in Canada, at which time the company would have no objection to its becoming dutiable at the general level of duty for organic chemicals. The rates generally proposed were 15 p.c., B.P., 20 p.c., M.F.N.

Naugatuck Chemicals Division of Dominion Rubber Company Limited submitted a brief concerning an insect repellent material, "DET," chemically named N, N-Diethyl-m-toluamide. At the time of the hearing (February 26, 1962), Naugatuck Chemicals claimed to be the only Canadian producer of this material which it regarded as the best all-purpose insect repellent developed to date. The colourless, almost oily liquid is sold to formulators of repellents who blend it as a 50 per cent solution in isopropyl alcohol, or as an aerosol spray or in stick or cream form.

Exports to Commonwealth countries were developing at the time of the hearing, but no quantitative information was available. The 95 per cent minimum m-isomer DET at the beginning of 1962 was quoted at \$2.25 per pound in 45 gallon drums, freight allowed.⁽³⁾

(1) Transcript, Vol. 70, p. 10740

(2) Same, Vol. 70, p. 10743

(3) Same, Vol. 70, p. 10746, 10749

The United States price for 90-95% metal isomer in drums, carload or truckload, at works, was \$2.30 per pound, in March 1963, and \$2.20 per pound, in July 1965.(1)

Imports of "DET" were said to be free of duty under tariff items 219a(2), non-alcoholic chemicals for repelling insects, etc., and 791, materials of all kinds for use in manufacturing such preparations.

In proposing rates of duty of 15 p.c., B.P. and 20 p.c., M.F.N. for N, N-diethyl-m-toluidine, Naugatuck Chemicals stated:

"we could not maintain our position as a manufacturer of chemicals in Canada if placed under a competitive disadvantage caused by higher duty rates on raw materials, unless we receive commensurate protection for the products which we make, and unless our customers receive commensurate protection for the formulations which they make."(2)

In a submission on agricultural chemicals, the Canadian Federation of Agriculture favoured the continuation of free entry under both B.P. and M.F.N. Tariffs for chemicals classified at present under items 219a(2) and 791.

Naugatuck Chemicals Division of Dominion Rubber Company Limited is the only producer in Canada of n-1 naphthylphthalamic acid (alanap). The size of the market in Canada was said to prohibit its economic manufacture on a continuous basis, and the company apparently produces it only sporadically to build up an inventory from which sales are made.(3)

The acid is prepared by the reaction of l-naphthylamine and phthalic anhydride, and is used as a selective pre-emergence herbicide, to control weeds and grasses especially when they occur among soybeans, asparagus and vine crops.

At the time of the hearing, Naugatuck Chemicals' price of "Alanap-3" containing 2.4 pounds of sodium N-1-naphthylphthalamate per gallon, was \$3 per gallon, in quantities of 90 gallons, freight allowed.(4)

N-1-naphthylphthalamic acid is free of duty from both B.P. and M.F.N. sources, under tariff item 219a(2) or under tariff item 791; otherwise it is dutiable at rates of Free, B.P., 15 p.c., M.F.N. under item 216. Naugatuck's proposal was that free entry of N-1-naphthylphthalamic acid under both B.P. and M.F.N. Tariffs be continued, but that when this product is ruled to be made in Canada, rates of 15 p.c., B.P. and 20 p.c., M.F.N. should apply "provided that the end products made from this chemical are also subject to these rates of duty."(5)

(1) Oil, Paint and Drug Reporter, selected issues

(2) Transcript, Vol. 70, p. 10747

(3) Same, Vol. 70, p. 10753, 10757

(4) Same, Vol. 70, p. 10753

(5) Same, Vol. 70, p. 10754

Smith Kline and French Inter-American Corporation, Montreal, made a submission on isopropanide iodide, used in the manufacture of pharmaceuticals. Imports were reported to be valued at about \$615 in the first half of 1960. It is dutiable under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. The brief requested that the rates of duty for isopropanide iodide be maintained at the current level. No objection was raised to this proposal: it was included as a more important chemical in a list of products by the Canadian Pharmaceutical Manufacturers Association for which the same rates were proposed for chemicals not made in Canada.

At the hearing on pesticides, in November 1962, a group of seven manufacturers of pesticides made a proposal concerning a list of biologically active materials for use in the manufacture of pesticide formulations. The companies were:

A.H. Howard Chemical Co. Ltd.	Orangeville, Ontario
Allied Chemical Services Ltd.	Calgary, Alberta
Chipman Chemicals Ltd.	Hamilton, Ontario
Gallowhur Chemicals Canada Ltd.	Lachine, Quebec
Manchester Products Ltd.	Galt, Ontario
Niagara Brand Chemicals	Burlington, Ontario
Green Cross Division of Sherwin Williams Co. of Canada Ltd.	Montreal, Quebec

The companies said:

"The Canadian formulating industry requires a tariff that will allow it to supply substantially the whole of the Canadian demand for formulated pesticides. It is believed that this can be achieved, in the case of commercial pesticides, tariff sub-item 219a(ii) by a tariff rate of B.P. 15% M.F.N. 20%, provided that the costs to the industry of raw materials, now entering free of duty under item 791, are not appreciably increased in comparison with those to foreign formulators."⁽¹⁾

While proposing that, when not made in Canada, the ingredients used in Canada for formulating pesticides be entered duty-free and that the formulated pesticides be protected, the companies considered that when the ingredients become made in Canada they should be subject to the rates proposed for this heading.

"The signatories of this brief share the view of the Chemical Industry Committee that, when a biologically active chemical, now on Appendix II, is made in Canada, it should become subject to the duty rates which have been recommended for the appropriate B.T.N. heading."⁽²⁾

The companies proposed duty-free entry for the materials until they are made in Canada. The proposal was based on the belief that a duty on biologically active materials, not made in Canada, would increase the prices of pesticides to Canadian users without producing off-setting advantages for any segment of industry. The products under the present heading are:

(1) Transcript, Vol. 108, p. 16329

(2) Same, Vol. 108, p. 16333

Chloro butynyl chloro-carbanilate
 Chlorodiallyl acetamide
 Chloromethylphenyl methyl-pentanamide
 Chlorophenyl dimethylurea trichloracetate
 Dimethylaminoxyl methyl carbamate
 Diuron
 Fenuron
 Isopropyl chlorocarbanilate
 Methyl naphthyl carbamate
 Monuron
 Naphthyl acetamide
 Naphthylphthalamic acid
 Phenyl dimethylurea trichloracetate
 Phosphamidon
 Propham

Pfizer Canada expressed an interest as an importer and re-seller or user in N-acetyl glucosamin, at a hearing in January 1962. It was said to be not made in Canada and the company noted that no useful purpose would be served by imposing duties on chemicals not made in Canada which it uses in its operations or imports for resale. Accordingly, it recommended that this chemical be dutiable at rates of Free, B.P. and 15 p.c., M.F.N. until it is made in Canada, at which time it should be subject to rates of 15 p.c., B.P. and 20 p.c., M.F.N.⁽¹⁾

Dominion Tar and Chemical Company and its subsidiary, Javex Company, submitted to the hearing of March 26, 1962 a list of ingredients of their respective household and commercial bleaches. "Halane" (dichloro-dimethyl hydantoin) was said to be the major ingredient of a brand-named dry bleach. In its end uses it appeared to be competitive with a number of chemicals with bleaching properties, classified in Brussels headings 28.31, 28.38, 28.46, and 29.35. In opposition to briefs by Procter and Gamble Company and Colgate-Palmolive Company, the Javex Company proposed that the level of tariffs applicable to dichlorodimethyl hydantoin (as to nine other named chemicals and formulations) should be 15 p.c., B.P. and 20 p.c., M.F.N.⁽²⁾ The discussion of the two briefs opposed by Javex appears elsewhere in this report, on potassium dichloroisocyanurate and trichloroisocyanuric acid, both of B.T.N. heading 29.35.

Other Representations

The Canadian Pharmaceutical Manufacturers Association submitted to the Board a list of chemicals used by its members in the manufacture of pharmaceutical products and recommended that some end-use treatment be adopted for these chemicals when imported for use in the manufacture of pharmaceutical products. The Association recommended that rates of Free, B.P. and 15 p.c., M.F.N. apply when the products are not made in Canada and that the heading rates proposed by the Industry Committee (15 p.c., B.P. and 20 p.c., M.F.N.) apply when they are made in Canada. The chemicals in the current heading to which these proposals apply are as follows, the more important chemicals indicated by an asterisk.

(1) Transcript, Vol. 68, p. 10428

(2) Same, Vol. 73, p. 11071

p-Acetamidophenol
 Acetanilide
 Acetylcarbromal
 Acid pentobarbital
 Allantoin
 Allobarbitone
 Allyl-isopropyl-acetyl carbamide*
 Allyl-isopropyl barbituric acid*

Barbitone
 Barbitone sodium
 Barbiturates*
 Barbituric acid
 Butobarbitone
 Butobarbitone sodium
 N-Butyl-Ethylbarbituric acid

Calcium nembital*
 Carbachol
 Cyclobarbitone

Ethamivan (Emivan)-(3-Methoxyl-4-hydroxybenzoic
 acid diethylamide)
 (2-Ethylcrotonoyl) Urea
 Ethotoin
 Ethyl carbamate

Formamide*

Hexobarbitone
 (N-hydroxyphenyl) trimethyl ammonium dimethyl
 carbamate

Isopropamide Iodide*

Meproamate*

Pentobarbitone
 Pentobarbitone sodium*
 Phenacetin (-Aceto-O-phenetidin)*
 Phenobarbital*
 Phenobarbital sodium pwd.
 Phenobarbital sodium pwd. (80 mesh)
 Phenobarbitone
 Phenobarbitone sodium
 Phenytoin

Salicylamide
 Sodium L-pantothenate
 Sodium secobarbital

Urea: containing in the dry state more than
 45 per cent by weight of nitrogen
 Urethan (ethyl carbamate)

The Industry Committee expressed the view that all products which currently had commercial importance were dealt with in the submission which the Board had received for this hearing. The Committee recommended that other products should be accorded tariff treatment of 15 p.c., B.P. and 20 p.c., M.F.N. under a general heading provision.

IMIDE-FUNCTION COMPOUNDS AND
IMINE-FUNCTION COMPOUNDS - B.T.N. 29.26

Imides and imines are compounds characterized by the NH group found in ammonia together with, respectively, a dibasic acyl radical and a non-acidic organic radical. Two compounds of this heading, fairly generally known, are saccharin and guanidine.

Although many chemicals of heading 29.26 were brought to the attention of the Board, most individually have little commercial importance in Canada.

The Canadian Pharmaceutical Manufacturers Association submitted a list of chemicals to the Board during the hearing in February 1962; the Association noted that these chemicals are of prime importance to the industry. The chemicals listed are as follows:

l-arginine l-glutamate
 bemegride
 chlorhexidine base
 chlorhexidine diacetate
 chlorhexidine dihydrochloride
 paludrine (proguanil hydrochloride)
 saccharine
 saccharine calcium USP

In addition to these products, the Association listed the following as chemicals in which its members are interested as users in the manufacture of pharmaceutical products. The Association proposed that some end-use treatment be adopted for the chemicals of both lists when for use in the manufacture of pharmaceutical products, and recommended rates of Free, B.P. and 15 p.c., M.F.N. when they are not made in Canada and rates of 15 p.c., B.P. and 20 p.c., M.F.N. when they are made in this country. The additional chemicals are as follows:

arginine
 n-bromosuccinimide
 glutethimide
 hexamine (hexamethylene tetramine)
 saccharine sodium salt
 thalidomide

At the time of the hearing hexamine was not made in Canada but it has since been ruled made and is dutiable under tariff item 711 at rates of 15 p.c., B.P., 20 p.c., M.F.N. Fine Chemicals of Canada Limited mentioned this chemical in its brief proposing amalgamation of tariff items 875a and 880p to eliminate the restriction on chemicals which may be imported duty-free for the manufacture of antibiotics.⁽¹⁾

⁽¹⁾ Transcript, Vol. 79, p. 12112

Canadian Industries Limited submitted a brief on dinitroso-pentamethylene tetramine (DNPT) which it now makes in Canada, supplanting supplies formerly imported by the company. DNPT is added to rubber when curing, and forms minute cells filled with nitrogen. Such rubber is used in shoe soles and in weather stripping for automotive use. The selling price of DNPT, on a 100 per cent basis, was said to be \$180 per 100 pounds, approximately the same as the U.S. price.⁽¹⁾ It is imported currently as a chemical preparation under tariff item 220a(i) at rates of 15 p.c., B.P. and 20 p.c., M.F.N. and C.I.L. recommended that these rates continue to apply. If imported as a single chemical, the product would be dutiable at Free, B.P., 15 p.c., M.F.N., under tariff item 208t.

Hexamethylene tetramine was the subject of a brief by Union Carbide Canada Limited which uses it as a raw material in the manufacture of phenol-aldehyde resins and moulding compounds. The company said that there is no known substitute. It is not made in Canada but is available from Europe and the United States. Imports in 1963 amounted to \$335,000 which, at about 23 cents per pound, represents a volume of some 1.5 million pounds. At the time of hearing it could be imported free of duty under tariff item 921 when for use in making synthetic resins; it has since been ruled "made in Canada" and is dutiable under tariff item 711, at rates of 15 p.c., B.P., 20 p.c., M.F.N. Union Carbide had recommended that this product be free of duty "until such time as it is ruled of a class 'made in Canada'".⁽²⁾

Colgate-Palmolive Limited presented a brief on sodium saccharinate, which is used as a sweetening agent in dental cream. It is not made in Canada and there was said to be no substitute made in this country. The current rates of duty, under tariff item 208t, are Free, B.P. and 15 p.c., M.F.N.; the company recommended rates of Free, B.P. and 10 p.c., M.F.N. and said, "We would have no objection to it becoming dutiable at the general level of duty for organic chemicals if and when the product is manufactured in Canada."⁽³⁾ John Wyeth and Brother (Canada) Limited proposed, for saccharine sodium, that there be no increase in rates of duty from those currently applicable under tariff item 208t until "a substantial portion of Canadian requirements is available from Canadian production."⁽⁴⁾

A submission by Ayerst, McKenna and Harrison Limited dealt with chlorhexidine and three of its salts as listed below. Not made in Canada, these are used as antibacterial agents in medical applications. The company sells the products which are imported from England; it recommended that the current rates of duty, Free, B.P. and 15 p.c., M.F.N., applicable under tariff item 208t, be retained. The chemicals are:

chlorhexidine
chlorhexidine diacetate
chlorhexidine dihydrochloride
chlorhexidine digluconate

(1) Transcript, Vol. 70, p. 10770

(2) Same, Vol. 70, p. 10791

(3) Same, Vol. 70, p. 10799

(4) Same, Vol. 70, p. 10800

The Rubber Association of Canada recommended that duties on two chemicals, di-ortho-tolylguanidine and diphenylguanidine be no higher than at present so long as they are not made in Canada. The Association said that it would not object to the imposition of duties, not exceeding the group heading rates, if they ever are made in Canada. The chemicals are imported principally from England. Consumption in 1960 was said to be valued at about \$145,000.

Guanidine nitrate is produced in Canada only by Cyanamid of Canada Limited near Niagara Falls, Ontario. It is used in making chlorinated bactericides, pharmaceuticals, sulpha drugs and pesticides. Productive capacity was said to be adequate to satisfy foreseeable Canadian requirements. It is currently imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. but the company requested that it should be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N.

The Industry Committee expressed the opinion that all products of commercial significance in Canada had been brought to the Board's attention and proposed that other chemicals within the heading be accorded the rates of duty recommended for the heading as a whole, 15 p.c., B.P. and 20 p.c., M.F.N.

At the hearing on pesticides, in November 1962, a group of seven manufacturers of pesticides made a proposal concerning a list of biologically active materials, among which were dodine, n-octyl bicycloheptene dicarboxamide for use in the manufacture of pesticide formulations. The companies were:

A.H. Howard Chemical Co. Ltd.	Orangeville, Ontario
Allied Chemical Services Ltd.	Calgary, Alberta
Chipman Chemicals Ltd.	Hamilton, Ontario
Gallowhur Chemicals Canada Ltd.	Lachine, Quebec
Manchester Products Ltd.	Galt, Ontario
Niagara Brand Chemicals	Burlington, Ontario
Green Cross Division	
Sherwin Williams Co. of	
Canada Ltd.	Montreal, Quebec

The companies proposed:

"The signatories of this brief share the view of the Chemical Industry Committee that, when a biologically active chemical, now on Appendix II, is made in Canada, it should become subject to the duty rates which have been recommended for the appropriate B.T.N. heading."⁽¹⁾

The companies proposed duty-free entry for the materials until they are made in Canada. The proposal was based on the belief that a duty on biologically active materials, not made in Canada, would increase the prices of pesticides to Canadian users without producing off-setting advantages for any segment of industry.

(1) Transcript, Vol. 108, p. 16332-3

NITRILE-FUNCTION COMPOUNDS - B.T.N. 29.27

Only four chemicals were brought to the attention of the Board under this heading: methyl cyanide, dicyandiamide, acrylonitrile, and adiponitrile. The last-named chemical is important as a nylon intermediate, and the general submissions on intermediates, dealt with under heading 29.22, are relevant to it; some additional information concerning it is given below, following dicyandiamide and acrylonitrile. In total, these chemicals have been produced or purchased in amounts of several millions of dollars annually, and there are indications of further significant growth in this total over the next few years.

Methyl cyanide (acetonitrile), as a material for use in the manufacture of synthetic rubber, was included in a more general proposal by Polymer Corporation for the continuation of the existing duty-free entry provided by tariff item 851 for such materials. Imports of acetonitrile in 1964 were one million pounds valued at \$303,000.

Dicyandiamide

Dicyandiamide, a white crystalline solid, is polymerized from cyanamide which, in turn, is made from limestone and carbon dioxide. The only producer of dicyandiamide in North America is Cyanamid of Canada Limited, near Niagara Falls, Ontario, although production from this plant competes in Canada, the United States and elsewhere with production from Norway and Japan.

Dicyandiamide is used mostly in the manufacture of melamine but some is used also in making pharmaceuticals, weed killers, synthetic resins and paints. A trade publication has estimated factory shipments at about 100 million pounds per year,⁽¹⁾ a substantial part of which probably is for export. Imports were said to be entered into Canada because some users found the foreign material better suited to their requirements; prices of imports were comparable to those of the domestic product. Exports, apparently, are substantial and are made to the United States and to the United Kingdom. Prices are not published in Canada or the United States.

Dicyandiamide is made in Canada but has not been so ruled for Customs purposes. It is entered under item 208t at rates of Free, B.P. and 15 p.c., M.F.N. (Cyanamid of Canada requested rates of 15 p.c., B.P. and 20 p.c., M.F.N.)⁽²⁾

Acrylonitrile

Acrylonitrile is a colourless, flammable, mobile liquid, soluble in alcohol, ether, carbon disulphide and most organic solvents but only slightly soluble in water. It is produced in one grade, technical, 99 per cent pure.

(1) Canadian Chemical Processing, July, 1965, p. 70

(2) Transcript, Vol. 71, p. 10832

Until recently most of it was made by the reaction of acetylene and hydrogen cyanide, although some had been made by dehydrating ethylene cyanohydrin, produced by the reaction between ethylene oxide and hydrogen cyanide. However, a newer process, synthesizing acrylonitrile from propylene and ammonia, is expected to account in the United States, for some 51 per cent of production by 1965 and 78 per cent by 1970.⁽¹⁾ This process was reported to be the one to be used in Canada by Imperial Oil Limited in a new plant at Sarnia, Ontario toward the end of 1965, the first plant announced for its production in Canada. At the time of the hearing in February 1962, Du Pont of Canada Limited noted that "the likelihood of economic domestic manufacture -- even if the total Canadian market were assured -- is therefore quite remote at this time."⁽²⁾ This opinion was based on an assessment of large overcapacity on a world-wide scale at the time. Since that time the situation has changed so much that trade sources are estimating that a world-wide shortage will not ease before the fourth quarter of 1965.⁽³⁾

All of the acrylonitrile used in Canada has been imported from the United States; just over 12 million pounds were imported in 1964, with a value of over \$2 million.

Acrylonitrile, Imports and Prices, 1956-64

<u>Year</u>	<u>Imports</u> \$'000	<u>U.S. Prices^(a)</u>	
		<u>High</u>	<u>Low</u>
		cents per pound	
1956	1,235	28	27
1957	1,565	27	27
1958	2,340	27	27
1959	2,665	27	26.49
1960	3,030	23	23
1961	2,395	23	14.50
1962	1,825	14.50	14.50
1963	1,855	17	14.50
1964	2,240	17	17

(a) Prices are quoted for tank cars: 1956-1961, freight equalized; 1962-1964, f.o.b. works

Source: Imports: Department of Trade and Commerce, Chemical Import Trends and, for 1964, D.B.S., Trade of Canada, Imports;
Prices: Oil, Paint and Drug Reporter

The quantity imported in 1964 is consistent with Du Pont of Canada's estimate that Canadian consumption of acrylonitrile was 10 to 15 million pounds per year.⁽⁴⁾ Trade sources estimate use by three companies, Du Pont, Dow and Polymer Corporation, somewhat higher, with immediate prospects for growth beyond 25 million pounds.

(1) Oil, Paint and Drug Reporter, May 18, 1964, p. 3

(2) Transcript, Vol. 71, p. 10843

(3) Oil, Paint and Drug Reporter, May 25, 1964

(4) Transcript, Vol. 71, p. 10843

Acrylonitrile is used in Canada by Du Pont, at Maitland, Ontario, as the major raw material in the manufacture of the acrylic fibre known as orlon. It is understood also to be used by Polymer Corporation in the manufacture of nitrile rubber, and by Polymer and by Dow Chemical to make acrylonitrile-butadiene-styrene (A.B.S.) resin.

Acrylonitrile can also be hydrodimerized to adiponitrile, thus replacing the usual route to adiponitrile through adipic acid. E.I. Du Pont de Nemours & Co. Inc. and Monsanto Chemical Company are developing the new process in the U.S.A. Du Pont of Canada uses adiponitrile to make nylon 6/6 at Maitland, Ontario, and in the future might conceivably have a demand for acrylonitrile in the manufacture of adiponitrile, as would any other producer of nylon 6/6 or nylon 610 in Canada.

The rate of expansion in total use of acrylonitrile in the U.S.A. has been very rapid, estimated by trade sources at more than 25 per cent annually in recent years. Some such rate of growth seems to be expected in Canada.

"With a potential market of more than 50 million pounds per year facing it, the Imperial Oil acrylonitrile plant could well match or improve upon the economics of U.S. acrylo producers who are now exporting to Canada."(1)

Acrylonitrile is dutiable under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N.; it may also be imported free of duty under tariff item 851 when for use in the manufacture of synthetic rubber, one of the principal uses of the product in Canada. It is named in tariff item 219e under which it is free of duty if it is for use in combatting destructive insects and pests.

Du Pont of Canada Limited was the only company appearing before the Board with a brief on acrylonitrile, and recommended that it be imported free of duty. The company mentioned that it was appearing as a consumer of this chemical and did not have sufficient data to recommend what rates of duty should apply when acrylonitrile is made in Canada. For the nylon intermediates which are made by Du Pont, the company proposed rates of 25 p.c., B.P. and 30 p.c., M.F.N.

Adiponitrile

Adiponitrile is made in Canada by Du Pont of Canada Limited at Maitland, Ontario by reacting adipic acid with ammonia. In the United States, the Du Pont company uses another method of making adiponitrile which starts with acrylonitrile, as noted above under acrylonitrile.

Du Pont uses its production of adiponitrile in the manufacture of the nylon 6/6 salt, hexamethylene diammonium adipate, as outlined in the general discussion of nylon intermediates under heading 29.22. Adiponitrile does not enter into Canadian trade.

(1) Canadian Chemical Processing, August, 1964, p. 38

At the time of the hearing, adiponitrile was dutiable under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. and, when for use in making plastics, under item 921, free of duty. Since then, however, the chemical has been ruled made in Canada and is dutiable under item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. In addition to the more general arguments advanced for nylon intermediates, which are dealt with under B.T.N. heading 29.22, Du Pont of Canada, the only company appearing before the Board with a presentation on adiponitrile, made four points which it said applied specifically to this product. It would be possible, the company noted, for a competitor, making nylon, to import adiponitrile because it is easily transported and stored; this would reduce the demand for Canadian productive facilities. The rates of duty proposed were designed "to encourage conditions whereby all of Canada's requirements of adiponitrile will continue to be met by domestic production, with attendant benefits to the Canadian economy."(1) It was said that competition between nylon and other natural and man-made fibres has more influence on prices than a tariff on intermediates. Further, "increased production volume can bring down unit costs, but such a cost reduction cannot be achieved if imports meet part of the requirements which could otherwise be met by domestic production."(2)

The rates of duty proposed by Du Pont of Canada Limited for nylon intermediates, including adiponitrile, were 25 p.c., B.P., 30 p.c., M.F.N. Du Pont argued that the same rates should apply to the resin and to all of the intermediate chemicals because the importation of any of the key products would weaken the competitive position of Canadian production of all of the chemicals going into the manufacture of nylon. This argument, together with the arguments in support of the rates of duty, are discussed in the part of the report on heading 29.22. No opposition was raised to the proposed rates as they apply specifically to adiponitrile though, as noted under heading 29.22, opposition was expressed to the proposal concerning nylon intermediates in general.

The Industry Committee expressed the opinion that all chemicals currently of commercial significance under heading 29.27 had been brought to the attention of the Board, and recommended that other chemicals of this heading be dutiable at the rates suggested generally for items worded like B.T.N. headings, namely 15 p.c., B.P. and 20 p.c., M.F.N.

(1) Transcript, Vol. 71, p. 10856

(2) Same, Vol. 71, p. 10856-7

DIAZO-, AZO- AND AZOXY-COMPOUNDS - B.T.N. 29.28

These compounds have two nitrogen atoms linked together; many of them are important constituents of organic dyes, as the starting point in the formation of azo dyes, but, as single chemicals, are not known to have commercial importance in Canada. The formulated dyes and colouring matter are dealt with in the part of the report on B.T.N. Chapter 32.

The only chemical to be brought to the Board's attention under this heading, 4-dimethylaminoazobenzene, was mentioned by the Canadian Pharmaceutical Manufacturers Association. No data were presented, but the Association in general maintained that chemicals for use in the manufacture of pharmaceutical products, when made in Canada should be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N. and those not made in Canada should be free of duty from B.P. countries and subject to a duty of 15 p.c., M.F.N., the existing provisions of tariff item 208t. This chemical is not known to be made in Canada and would be dutiable under item 208t except for possible free entry under all Tariffs when for use in the manufacture of coal tar dyes.

The Industry Committee recommended that:

"Although some chemicals have been listed as examples under Heading 29.28, none appears to have sufficient commercial importance for any company to come forward at this time with recommendations. As far as the Committee has been able to determine, all chemicals of this heading are currently neither made in Canada nor possessed of significant commercial importance. In these circumstances, the Committee recommends the heading classification and rates of duty as appropriate treatment for all products of Heading 29.28."⁽¹⁾

The rates of duty proposed by the Committee for the heading were 15 p.c., B.P., 20 p.c., M.F.N. The chemicals of the heading which are not made in Canada would, under the existing Tariff, be generally dutiable under item 208t at Free, B.P., 15 p.c., M.F.N., subject, in many cases, to the duty-free provisions of tariff item 203f noted above.

⁽¹⁾ Transcript, Vol. 71, p. 10880

ORGANIC DERIVATIVES OF HYDRAZINE OR OF HYDROXYLAMINE - B.T.N. 29.29

This heading applies to organic chemicals which can be regarded as derivatives obtained from hydrazine or hydroxylamine by replacing one of the hydrogen atoms by an organic radical. The chemicals of the heading are generally highly unstable.

The three products of this heading which came before the Board, as listed below, are used in paints and varnish to prevent the formation of a skin on the surface of these products in containers. They are not made in Canada but are imported mostly from the United States although imports are also available from the United Kingdom. In 1961, the last year for which data are available, the paint industry used 277,474 pounds of anti-skinning agents valued at \$274,151, most of which was made up of the products of heading 29.29.⁽¹⁾

Two briefs were received by the Board on the following three chemicals. Nuodex Products of Canada, Limited distributes in Canada the products made in the United States by National Aniline Division, Allied Chemical Corporation. The other brief was presented by the Canadian Paint Varnish and Lacquer Association. Both recommended free entry for the products in place of the rates currently applicable under tariff item 208t, Free, B.P. and 15 p.c., M.F.N. The principal reason for the proposed change was that, while all three are available from the United States, only methyl ethyl ketoxime is available from the United Kingdom, with the result that the user of butyraldioxime and cyclohexanone oxime "incurs the extra burden of duty".⁽²⁾ The chemicals to which these proposals apply are:

butyraldioxime
methyl ethyl ketoxime
cyclohexanone oxime

In 1963, imports of methyl ethyl ketoxime were valued at \$130,000.

Another chemical, listed by the Industry Committee but not discussed at the hearing, was 1-benzyl-2-trimethyl acetyl hydrazine. No change from the rates currently in effect under item 208t, Free, B.P. and 15 p.c., M.F.N., was proposed.

The Industry Committee expressed the opinion that all chemicals currently of commercial significance had been brought to the attention of the Board and proposed that others be dutiable at the rates proposed for the heading, 15 p.c., B.P. and 20 p.c., M.F.N.

(1) D.B.S.; Paint and Varnish Manufacturers, 1961; Cat. No. 46-210

(2) Transcript, Vol. 71, p. 10887

COMPOUNDS WITH OTHER NITROGEN-FUNCTIONS - B.T.N. 29.30

The Industry Committee noted that heading 29.30 ensures that organic chemicals which contain nitrogen, and which are not defined by other headings of B.T.N. Chapter 29, will be located near other nitrogen-bearing organic chemicals rather than in the miscellaneous assortment in heading 29.45.

Two chemicals were brought to the attention of the Board under this heading, toluene diisocyanate and diphenylmethane diisocyanate.

These two products are competitive in the uses to which they are put; each may be used as a component in the manufacture of flexible and rigid urethane foams and in adhesives and surface coatings. Toluene diisocyanate is now made in Canada by Allied Chemical Canada Limited.

Three companies presented briefs on toluene diisocyanate: Allied Chemical Canada Limited, Naugatuck Chemicals Division of Dominion Rubber Company Limited and Imperial Chemical Industries Limited. The Rubber Association of Canada, as noted below, also expressed an interest in it. I.C.I. put forward the only proposals for diphenylmethane diisocyanate, noting that, while at the time of the hearing in February 1962 the greater part of the supply of the product was coming from the United States, production in the United Kingdom was increasing and the company hoped to supply more of Canadian requirements. Diphenylmethane diisocyanate was said to be the more expensive of the two materials because of higher costs of production.

Both of these products, at the time of the hearing, were dutiable under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. or free of duty, while ruled to be not made in Canada, under item 92l when for use in making synthetic resins, though, as noted below, the situation has since changed for toluene diisocyanate.

Allied Chemical Canada Limited proposed for the toluene diisocyanate that the rates in effect at the time of the hearing should continue "until the construction of the toluene diisocyanate plant is completed in 1963, at which time we recommend that the rates of 15 per cent British Preferential and 20 per cent Most Favoured Nation be instituted."⁽¹⁾ Toluene diisocyanate (not less than 80% distillable) was ruled made in Canada in 1964, and is dutiable under tariff item 71l at rates of 15 p.c., B.P., 20 p.c., M.F.N. The question of grades or of distillation characteristics was not introduced by the companies making proposals to the Board. Naugatuck said that it supported the recommendation that toluene diisocyanate be free of duty until it is made in Canada; the company took the general position that it did not object to rates of duty proposed by manufacturers provided that the Board also recommended the rates of duty proposed by it for products of its manufacture.

(1) Transcript, Vol. 71, p. 10898

Imperial Chemical Industries proposed that "If the Board should recommend that this 'end-use' item 921 be eliminated, I.C.I. requests ... that these isocyanates continue to be dutiable at the 208t rates of Free B.P. and 15 p.c. M.F.N. until such time as Canadian requirements are substantially met from Canadian production."⁽¹⁾ The price of toluene diisocyanate from the U.K. was said to be competitive with that of the U.S. product.

The Rubber Association of Canada noted that toluene diisocyanate is used by its members in making polyurethane foam. The Association requested that, when this chemical is for use in making polyurethane foams, it should remain free of duty until it is ruled of a kind made in Canada, and that "when it is made in Canada the rates of duty then imposed should be somewhat lower than the rates applicable to polyurethane foam, now dutiable under tariff item 907 at B.P. - 15 per cent; M.F.N. - 20 per cent."⁽²⁾

Sodium cyclamate was included in a list of chemicals in a proposal by the Canadian Pharmaceutical Manufacturers Association. No data were provided but the Association proposed generally that some end-use treatment be adopted for chemicals used in making pharmaceutical products. The Association recommended rates of Free, B.P. and 15 p.c., M.F.N. for the chemicals when not made in Canada and the heading rates proposed by the Industry Committee, 15 p.c., B.P. and 20 p.c., M.F.N. when they are made here.

The Industry Committee expressed the opinion that all chemicals of commercial significance had been brought to the attention of the Board, and recommended that other chemicals be dutiable under the heading rates proposed, 15 p.c., B.P. and 20 p.c., M.F.N.

(1) Transcript, Vol. 71, p. 10904

(2) Same, Vol. 70, p. 10805

ORGANO-SULPHUR COMPOUNDS - B.T.N. 29.31

This heading applies to organic chemicals with a molecular structure in which a carbon atom is directly linked to a sulphur atom which is not part of a sulphonie group. It does not include carbon disulphide, carbon oxysulphide or other carbon-sulphur compounds classified as inorganic chemicals of Chapter 28.

The products of the heading are of relatively small significance in Canadian production and trade; production in Canada of products classified by this heading is estimated to have represented in 1962, less than one per cent of the value of production of the products of B.T.N. Chapter 29 as a whole. Imports, similarly, probably do not amount to over \$3 million. The products are dealt with here in the order in which they came before the Board.

Disodium ethylene bisdithiocarbamate, made in Canada by Naugatuck Chemicals Division of Dominion Rubber Company Limited, is also known by the trade name "Nabam." Naugatuck sells the product to formulators of fungicides who export their products because, it was said, sales in Canada would infringe patent rights of the other producer of Nabam and fungicides, Rohm and Haas Company of Canada Limited.⁽¹⁾ It is imported into Canada free of duty under tariff items 219a(2) and 791 for use as a fungicide or as a material for making fungicide products. Sales of Nabam in the 12 months ending September 30, 1964 amounted to 411,196 pounds, valued at \$275,306.⁽²⁾ Naugatuck submitted the only brief on this chemical and said:

"In line with our previous statements (BTN 29.16), we could not maintain our position as a manufacturer of chemicals in Canada if placed under a competitive disadvantage caused by higher duty rates on raw materials unless we receive commensurate protection for the products we make, and unless our customers receive commensurate protection for the formulations which they make. Naugatuck Chemicals therefore submits that the duty rates proposed by the Industry Committee for BTN 29.31, viz., 15 per cent B.P. and 20 per cent M.F.N. are the proper rates for disodium ethylene bisdithiocarbamate (Nabam)."⁽³⁾

Naugatuck Chemicals used the same statement in describing its position with respect to tetramethylthiuram disulphide, tetramethylthiuram monosulphide and tetraethylthiuram disulphide. The first two of these chemicals are made by the company and are known respectively as Tuex (or Thiram) and Monex. The third, known as Ethyl Tuex, was, but is understood to be no longer, made in Canada; it is ruled "made in Canada". It is imported by Naugatuck from its parent company in the U.S.A.

The first two are used as accelerators in rubber compounding. In addition, tetramethylthiuram disulphide, under the name Thiram, is used as a seed or foliage fungicide. When for use in making synthetic rubber, the products are free of duty under tariff item 851; when for

(1) Transcript, Vol. 72, p. 10913

(2) D.B.S., Sales of Pest Control Products by Canadian Registrants, Cat. No. 46-212

(3) Transcript, Vol. 72, p. 10917

use in compounding natural rubber, they are dutiable under item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. When it is to be used for agricultural purposes, Thiram may be imported free of duty under items 791 or 219a(2). Tetraethylthiuram disulphide is also dutiable under item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. Naugatuck proposed rates of 15 p.c., B.P. and 20 p.c., M.F.N. for tetramethylthiuram disulphide and tetramethylthiuram monosulphide, but did not include tetraethylthiuram disulphide in this recommendation, presumably because at that time it was not yet made in Canada.⁽¹⁾

Six other chemicals used in compounding rubber were also brought to the attention of the Board by Naugatuck Chemicals. They are:

sodium diethyl dithiocarbamate
sodium dimethyl dithiocarbamate
selenium diethyl dithiocarbamate
zinc dibutyl dithiocarbamate
zinc diethyl dithiocarbamate
zinc dimethyl dithiocarbamate

They are made in Canada by Naugatuck and imports would be dutiable under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. Naugatuck recommended that they continue to be dutiable at these rates. Concerning sodium dimethyl dithiocarbamate, Polymer Corporation Limited said "we consider it essential the tariff provisions in respect of materials for use in the manufacture of synthetic rubber, now contained in item 851, be continued..." This chemical would be imported free of duty under item 851.

Canadian Chemical Company Limited submitted a brief on three xanthates, sodium isopropyl xanthate, sodium sec-butyl xanthate and potassium amyl xanthate. The company noted that there are three other producers of xanthates in Canada, Cyanamid of Canada Limited, Courtaulds (Canada) Limited and Du Pont of Canada Limited. These other companies did not present briefs on the subject. The only commercial use of xanthates in Canada was said to be as collectors in the flotation of metallic sulphide ores; consumption was estimated at about 5 million pounds per year at the time of the hearing in 1962, with imports estimated at about 2.5 million pounds. Over 40 per cent of consumption was said to occur west of the Great Lakes. Imports of xanthates for ores in 1963 amounted to about 3.7 million pounds, valued at some \$1.2 million. In 1964, imports of xanthates amounted to nearly 4.5 million pounds, with a value of about \$1.2 million; they came mostly from the United States but also from Belgium, West Germany and Japan.

Xanthates for use in the process of concentrating ores are provided for in tariff item 208u and may be imported free of duty. Sodium isopropyl xanthate and potassium amyl xanthate have been ruled made in Canada and are dutiable under item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. when they are intended for other uses. Canadian Chemical Company said in this respect: "In practice, however, all imports qualify for entry under tariff item 208u..."⁽²⁾ Because imports are entered duty-free, the company pointed out that Canadian

(1) Transcript, Vol. 72, p. 10932

(2) Same, Vol. 72, p. 10971

prices must be competitive with foreign prices and that because they are competitive Canadian Chemical has won an enlarging share of the domestic market.

Canadian Chemical Company proposed rates of 15 p.c., B.P. and 20 p.c., M.F.N. for xanthates. The spokesman said that this proposal was more a matter of principle than of economics, noting that the company's customers are in a position to benefit from drawback provisions on a large part of their consumption of xanthates. In this connection he said, "the company has every expectation of having to meet world competition at world prices, and it is not quarelling with this." (1) Later in the hearing he said:

"It is possible and there are circumstances in which chemicals are sold at two prices; one reflecting the drawback and another price for that part of their consumption which is not subject to drawback ... it is my understanding that the company does not contemplate pursuing a price policy of that kind." (2)

The spokesman for Dow Chemical Company of Canada Limited, while agreeing that the three xanthates mentioned by Canadian Chemical Company Limited "account for the bulk of the business", stated that Dow Chemical Company produces in the United States and sells in Canada ten different xanthates. He said that some of these are used by the mines in preference to those listed by Canadian Chemical, at times because of economics and at other times because of technical preference.

The Consolidated Mining and Smelting Company of Canada Limited submitted a brief in which it noted its consumption of sodium isopropyl xanthate, some of which it had imported and some of which, following production in Canada, it had purchased from Canadian Chemical Company Limited. The company said that it proposed to continue to buy its requirements from that company "as long as the Canadian price is competitive." (3) Consolidated Mining proposed that end-use item 208u be retained so that the Canadian price of xanthates will reflect the duty-free price of imported xanthates. The company agreed that the duty-free provision need not be restricted exclusively to the end-use of concentrating ores, metals or minerals, as provided in existing tariff item 208u.

The Canadian Pulp and Paper Association expressed an interest in "organo-sulphur compounds", used by the industry as slimicides, saying:

"we must strongly oppose any revision which would result in an increase over current tariff rates, either now or in the future, in respect of chemicals used by the pulp and paper industry..." (4)

The Association provided no data nor did it make any proposal.

(1) Transcript, Vol. 72, p. 10992

(2) Same, Vol. 72, p. 11000

(3) Same, Vol. 72, p. 11004

(4) Same, Vol. 72, p. 11010

Polymer Corporation Limited mentioned three chemicals in addition to the sodium dimethyl dithiocarbamate noted above, used in the manufacture of synthetic rubber for which the company "considers it essential" that the duty-free entry of chemicals for use in the manufacture of synthetic rubber, as provided by tariff item 851, be continued. The chemicals listed were:

mixed tertiary mercaptan
primary dodecyl mercaptan
tertiary dodecyl mercaptan

John Wyeth and Brother (Canada) Limited proposed that there be no increase in the rates of duty applicable on DL methionine currently imported under tariff item 216 at rates of Free, B.P. and 15 p.c., M.F.N., until such time as a substantial portion of Canadian requirements is available from Canadian production.

Imperial Chemical Industries Limited submitted a proposal to the Board on thiocarbanilide, not made in Canada but imported from the United Kingdom for use in the flotation of metals from ores. It is similar in this use, and competitive with the xanthates mentioned earlier. It may also be used as an accelerator in the manufacture of rubber, but has been largely supplanted in this use by other products. I.C.I. proposed that the rates of duty currently applicable under tariff item 208t, Free, B.P., 15 p.c., M.F.N., be continued until domestic requirements are substantially met from Canadian production; at that time the company would not oppose rates of 15 p.c., B.P. and 20 p.c., M.F.N.

Robinson Brothers Limited submitted two briefs on chemicals which the company said are not made in Canada. These briefs are considered together because the proposals are identical. All of the chemicals listed below are dutiable under either tariff item 208t or 216, at rates of Free, B.P. and 15 p.c., M.F.N. except that sodium diamyl dithiocarbamate may be entered duty-free under item 851 when for use in making synthetic rubber. Those to which item 216 applies are:

thioglycollic acid
thiobenzoic acid
lauryl mercaptoacetic acid
dithioglycollic acid
3,3'-thiodipropionic acid

The company, noting that these are not made in Canada said, "we are of the opinion that until such time as they are produced in Canada, the status quo should be preserved and the duty should remain as at present, namely, zero per cent B.P., 15 per cent M.F.N."(1)

The list of chemicals included in the Robinson Brothers' brief is:

thioglycollic acid
 ammonium thioglycollate
 monoethanolamine thioglycollate
 potassium thioglycollate
 sodium thioglycollate
 calcium thioglycollate
 methyl thioglycollate
 ethyl thioglycollate
 isopropyl thioglycollate
 n-butyl thioglycollate
 amyl thioglycollate
 capryl thioglycollate
 n-octyl thioglycollate
 cyclohexyl thioglycollate
 lauryl thioglycollate
 stearyl thioglycollate
 ethylene glycol bis thioglycollate
 2-ethyl hexyl thioglycollate
 isoOctyl thioglycollate
 thiobenzoic acid
 zinc thiobenzoate
 sodium thiobenzoate
 lauryl mercaptoacetic acid
 dithiodiglycollic acid
 dibutyl dithiodiglycollate
 3,3'-thiodipropionic acid
 N,N'-dibutyl thiourea
 N,N'-diethyl thiourea
 di-isopropyl xanthogen disulphide
 zinc isopropyl xanthate
 2,2'-Di (carboxy methyl thio.) diethyl ether
 1,1-Di (carboxymethyl thio) methane
 1,2-Di (carboxy methyl thio) ethane
 1,4-Di (carboxy methyl thio) butane
 dibenzoyl disulphide
 potassium dimethyl dithiocarbamate
 di methylammonium dimethyl dithiocarbamate
 cupric dimethyl dithiocarbamate
 lead dimethyl dithiocarbamate
 ferric dimethyl dithiocarbamate
 nickel dimethyl dithiocarbamate
 sodium dimethyl dithiocarbamate
 sodium N-methyl dithiocarbamate
 zinc dimethyl dithiocarbamate - cyclohexylamine complex
 ammonium diethyl dithiocarbamate
 sodium diethyl dithiocarbamate
 dibutyl ammonium dibutyl dithiocarbamate
 nickel dibutyl dithiocarbamate
 sodium dibutyl dithiocarbamate
 zinc dibutyl dithiocarbamate - dibutylamine complex
 sodium diamyl dithiocarbamate
 zinc diamyl dithiocarbamate
 cadmium diamyl dithiocarbamate
 diamylammonium diamyl dithiocarbamate
 sodium ethylene bis dithiocarbamate
 zinc ethylene bis dithiocarbamate
 manganese ethylene bis dithiocarbamate
 zinc dibenzyl dithiocarbamate
 tetraethyl thiuram disulphide
 tetrabutyl thiuram disulphide
 tetrabenzyl thiuram disulphide

The spokesman for the Industry Committee drew attention to the fact that the company had provided no data to the Board concerning the uses to which these chemicals are put, the volume of shipments to Canada "or, for that matter, anything else."

The spokesman for Naugatuck Chemicals drew attention to the following chemicals which it makes in Canada and which the Robinson Brothers' brief included as not made. Not all of these have been ruled made in Canada for Customs purposes. The products are:

zinc dimethyl dithiocarbamate
 zinc dibutyl dithiocarbamate
 diamylammonium diamyl dithiocarbamate
 sodium ethylene bis dithiocarbamate
 zinc ethylene bis dithiocarbamate
 manganese ethylene bis dithiocarbamate
 tetraethyl thiuram disulphide

In addition, sodium diethyl dithiocarbamate and sodium dimethyl dithiocarbamate are now ruled made in Canada.

The Canadian Pharmaceutical Manufacturers Association submitted to the Board a list of chemicals used by its members in the manufacture of pharmaceutical products and recommended that some end-use treatment be adopted for these chemicals when for that use. The Association recommended that rates of Free, B.P. and 15 p.c., M.F.N. apply when the chemicals are not made in Canada and that the heading rates suggested by the Industry Committee, 15 p.c., B.P. and 20 p.c., M.F.N., should apply when they are made in Canada. The chemicals in the present heading to which this proposal applies are:

isobornyl thiocyanatoacetate
 methionine
 potassium ethylxanthate
 thioglycollic acid

At the hearing on pesticides, in November 1962, a group of seven manufacturers of pesticides made a proposal concerning a list of biologically active materials for use in the manufacture of pesticide formulations. The companies were:

A.H. Howard Chemical Co. Ltd.
 Allied Chemical Services Ltd.
 Chipman Chemicals Ltd.
 Gallowhur Chemicals Canada Ltd.
 Manchester Products Ltd.
 Niagara Brand Chemicals
 Green Cross Division
 Sherwin Williams Co.
 of Canada Ltd.

Orangeville, Ontario
 Calgary, Alberta
 Hamilton, Ontario
 Lachine, Quebec
 Galt, Ontario
 Burlington, Ontario

Montreal, Quebec

The companies proposed:

"The signatories to this brief share the view of the Chemical Industry Committee that, when a biologically active chemical, now on Appendix II, is made in Canada, it should become subject to the duty rates which have been recommended for the appropriate B.T.N. heading."⁽¹⁾

When not made in Canada, the products would be entered duty-free by the proposal of the pesticide formulators.

The proposal was based on the belief that a duty on biologically active materials, not made in Canada, would increase the prices of pesticides to Canadian users without producing off-setting advantages for any segment of industry. The products under the present heading are:

2-Butoxy-2-thiocyano diethyl ether
 Captan
 Chloroallyl diethyl dithiocarbamate
 Demeton
 Dichloroallyl diisopropylthiol carbamate
 Diethyl p-chlorophenyl-thio methyl dithiophosphate
 Diethyl ethylthioethyl dithiophosphate
 Ethion
 Ferbam
 Isobornyl thiocynoacetate
 Malathion
 Maneb
 Sodium methyldithiocarbamate
 Tetrachlorodiphenyl sulphone
 Trichloroallyl diisopropylthiol carbamate
 Trichloromethyl thiophthalimide
 Zineb
 Ziram

The Industry Committee expressed the opinion that all the products of this heading of commercial importance at that time had been dealt with in submissions which the Board had received for the hearing. Although some other products had been brought to the attention of the Committee, they apparently were not of sufficient importance for any company to make recommendations on them before the Board. The Committee recommended that products for which other proposals had not been made "be accorded tariff treatment by the classification and rates of duty for heading No. 29.31",⁽²⁾ namely 15 p.c., B.P. and 20 p.c., M.F.N.

(1) Transcript, Vol. 108, p. 16332-3

(2) Same, Vol. 72, p. 10911

ORGANO-ARSENIC COMPOUNDS - B.T.N. 29.32

This heading applies to organic chemicals with a molecular structure in which a carbon atom is directly linked to an arsenic atom. No company presented proposals on any chemical of this heading. The Industry Committee noted that arsphenamine, neoarsphenamine and sulpharsphenamine were at one time listed as made in Canada but are no longer so listed. The Committee suggested that 3-nitro-4-hydroxy-phenylarsonic acid might have current commercial significance in making feeds for animals and expressed the opinion that the Board had not received a brief on the chemical because it is imported under tariff item 219h, an item not in Reference 120. The Committee recommended that it be free of duty regardless of the use to which it is to be put. Imports of the product were recorded as \$470,000 in 1963.

The Canadian Pharmaceutical Manufacturers Association submitted to the Board a list of chemicals used by its members in the manufacture of pharmaceutical products and recommended that some end-use treatment be adopted for these chemicals when so used. The Association recommended that rates of Free, B.P. and 15 p.c., M.F.N. should apply when the chemicals are not made in Canada but that the heading rates proposed by the Industry Committee, 15 p.c., B.P. and 20 p.c., M.F.N., should apply when they are made in Canada. The chemicals in the present heading to which this proposal applies are:

acetarsol
arsanilic acid
sodium arsanilate

At the hearing on pesticides, in November 1962, a group of seven manufacturers of pesticides made a proposal concerning a list of biologically active materials, among which was disodium methane-arsonate, for use in the manufacture of pesticide formulations. The companies were:

A.H. Howard Chemical Co. Ltd.	Orangeville, Ontario
Allied Chemical Services Ltd.	Calgary, Alberta
Chipman Chemicals Ltd.	Hamilton, Ontario
Gallowhur Chemicals Canada Ltd.	Lachine, Quebec
Manchester Products Ltd.	Galt, Ontario
Niagara Brand Chemicals	Burlington, Ontario
Green Cross Division	
Sherwin Williams Co. of	
Canada Ltd.	Montreal, Quebec

The companies proposed:

"The signatories of this brief share the view of the Chemical Industry Committee that, when a biologically active chemical, now on Appendix II, is made in Canada, it should become subject to the duty rates which have been recommended for the appropriate B.T.N. heading."(1)

The companies proposed duty-free entry for these materials until they are made in Canada. The proposal was based on the belief that a duty on biologically active materials, not made in Canada, would increase the prices of pesticides to Canadian users without producing offsetting advantages for any segment of industry.

The Committee recommended that all other chemicals of this heading be dutiable at the rates proposed for the heading, 15 p.c., B.P. and 20 p.c., M.F.N.

ORGANO-MERCURY COMPOUNDS - B.T.N. 29.33

This heading applies to organic chemicals with a molecular structure in which a carbon atom is directly linked to a mercury atom.

One chemical to come before the Board under this heading was phenyl mercuric acetate; it and the products made from it are used as bactericides and fungicides. It is imported free of duty under tariff item 791 when it is to be used in the manufacture of products for these purposes or under item 219a(2) if used directly for them. Otherwise, it is dutiable under tariff item 208t at Free, B.P., 15 p.c., M.F.N. Nuodex Products of Canada Limited proposed that it continue to be free of duty until it is made in Canada.

The Canadian Pulp and Paper Association included phenyl mercuric acetate in a general statement, saying, "we must strongly oppose any revision which would result in an increase over current tariff rates ..."(i) in respect of chemicals used by the pulp and paper industry ..."

The Canadian Pharmaceutical Manufacturers Association submitted to the Board a list of chemicals used by its members in the manufacture of pharmaceutical products and recommended that some end-use treatment be adopted for these chemicals when so used. The Association recommended that rates of Free, B.P. and 15 p.c., M.F.N. apply when the chemicals are not made in Canada but that rates of 15 p.c., B.P. and 20 p.c., M.F.N. apply when they are made in Canada. The products in the present heading to which this proposal applies, with the most important product marked by an asterisk, are:

mersalyl acid *
phenylmercury acetate
phenylmercury nitrate
thiomersal

At the hearing on pesticides, in November 1962, a group of seven manufacturers of pesticides made a proposal concerning a list of biologically active materials for use in the manufacture of pesticide formulations. The companies were:

A.H. Howard Chemical Co. Ltd.	Orangeville, Ontario
Allied Chemical Services Ltd.	Calgary, Alberta
Chipman Chemicals Ltd.	Hamilton, Ontario
Gallowhur Chemicals Canada Ltd.	Lachine, Quebec
Manchester Products Ltd.	Galt, Ontario
Niagara Brand Chemicals	Burlington, Ontario
Green Cross Division	
Sherwin Williams Co. of Canada Ltd.	Montreal, Quebec

The companies proposed:

"The signatories of this brief share the view of the Chemical Industry Committee that, when a biologically active chemical,

now on Appendix II, is made in Canada, it should become subject to the duty rates which have been recommended for the appropriate B.T.N. heading."⁽¹⁾

The proposal was based on the belief that a duty on biologically active materials, not made in Canada, would increase the prices of pesticides to Canadian users without producing offsetting advantages for any segment of industry. The products under the present heading are:

ethyl mercury chloride
methyl mercury nitrile
phenyl mercury acetate
phenyl mercury chloride
phenyl mercury formamide
phenyl mercury triethanol ammonium lactate

Nuodex Products of Canada, Limited advised the Board that it has an interest in solutions of phenyl mercuric acetate, phenyl mercuric oleate and di (phenyl mercuric) dodecenyl succinate, but noted that these are pesticidal preparations as defined in the Explanatory Notes to B.T.N. heading 38.11 and stated that the company would submit a brief on them under that heading. Under that heading, the company noted that solutions were at present duty-free under item 219a when for use as pesticide preparations but, because the company manufactures these solutions, it requested rates of 15 p.c., B.P., 20 p.c., M.F.N.⁽²⁾ Pesticide preparations are dealt with in the report on B.T.N. heading 38.11.

The Industry Committee expressed the opinion that all chemicals currently of commercial significance under this heading had been dealt with before the Board and that any other product in the heading should be dutiable at the rates proposed for the heading, 15 p.c., B.P. and 20 p.c., M.F.N.

⁽¹⁾ Transcript, Vol. 108, p. 16333

⁽²⁾ Same, Vol. 109, p. 16518

OTHER ORGANO-INORGANIC COMPOUNDS - B.T.N. 29.34

This heading applies to organic chemicals with a molecular structure in which a carbon atom is directly linked to an atom of an element other than a halogen, oxygen, nitrogen, sulphur, arsenic or mercury.

The Industry Committee noted that companies which had earlier expressed an interest to the Committee in dibutyl tin dilaurate and tetrakis(hydroxymethyl)phosphonium chloride, and had recommended free entry for these chemicals, had "recently indicated that they no longer consider the chemicals sufficiently important to warrant any submission on them at this time."⁽¹⁾ The Committee recommended that these, as well as any other chemicals in the heading for which other proposals had not been received, be dutiable at the rates suggested for the heading, 15 p.c., B.P. and 20 p.c., M.F.N.

Ethyl Corporation of Canada Limited presented a brief on tetraethyl lead (TEL) and tetramethyl lead (TML). These chemicals are mixed with other chemicals such as ethylene dibromide and ethylene dichloride to form anti-knock preparations for internal combustion engines. The chemicals themselves, however, are not distributed or traded, the anti-knock compounds being prepared and distributed by the makers of TEL and TML. Compounds containing tetraethyl lead are dutiable under tariff item 263 at rates of Free, B.P. and 5 p.c., M.F.N.; compounds containing tetramethyl lead are dutiable under tariff item 263e at rates of $12\frac{1}{2}$ p.c. under both Tariffs. As these are not traded or used as single, chemically defined products, no tariff proposal was made for them, but the compounds made from them were discussed further under anti-knock preparations of B.T.N. heading 38.14.

A joint submission was presented on cyclic siloxanes and monomeric silanes by three companies, Canadian General Electric Company Limited, Dow Corning Silicones Ltd. and Union Carbide Canada Limited. The companies proposed that imports of these products be entered duty-free. The companies' interest is in the direct use of these products and also in their use as intermediates for the manufacture of silicones of B.T.N. 39.01; at the time of the hearing in May 1962, the silicones were imported by the above companies for resale in Canada.

The joint brief listed a number of products, as noted below, which the companies import from their respective associated companies in the United States because they are not made in Canada. There are no data available concerning imports of the silanes or siloxanes but imports of silicones, which are made from monomeric silanes, were valued, in 1963, at just over \$1 million.

Cyclic siloxanes and monomeric silanes are imported generally under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. When they are used in the manufacture of silicones, they are free of duty under item 921; they may also be imported free of duty under item 851 when for use in making synthetic rubber. The three companies in their joint brief recommended that the specific products listed in the appendix to their brief, and reproduced below, be entered free of duty

(1) Transcript, Vol. 72, p. 11034

until ruled as of a class made in Canada. In making this proposal, the companies said:

"The principle of allowing the entry of primary raw materials or intermediates duty free or at low rates until they are produced in Canada is not a new one as demonstrated by such tariff items as 208t, 216, 219h and 921 ... The advantages of this concept are that it facilitates the establishment of secondary industry, the development of markets, and, most important, the provision of employment for Canadians ... The Board has heard many requests for similar treatment for such materials with no evidence that it in any way destroys the incentive for eventual manufacture in Canada."(1)

When the products are made in Canada, the companies proposed that they be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N. The chemicals listed by the companies under this heading are:

Monomeric Silanes

Methyltrichlorosilane	Ethyltrichlorosilane
Dimethyldichlorosilane	g-Aminopropyltriethoxysilane
Trimethylchlorosilane	Amyltrichlorosilane
Methyldichlorosilane	Amyltriethoxysilane
Dimethyldiethoxysilane	Aminoethyl-g-trimethoxysilylpropylimine
Sodium Methylsilanolate	3,4 Epoxycyclohexylethyltrimethoxysilane
Phenyltrichlorosilane	Glycidoxypropyltrimethoxysilane
Diphenyldichlorosilane	Vinyltri (2-methoxyethoxy) silane
Diphenylsilanediol	Methyltri (2-methoxyethoxy) silane
Methylphenyldichlorosilane	Methyltriethoxysilane
Vinyltrichlorosilane	Diphenyldiethoxy silane
Vinyltrimethoxysilane	b-Cyanoethyl triethoxysilane
Vinyltriethoxysilane	b-Cyanoethylmethyldiethoxysilane
Methylvinylchlorosilane	

Cyclic Siloxanes

Hexamethylcyclotrisiloxane	Tetramethyltetraphenylcyclotetrasiloxane
Octamethylcyclotetrasiloxane	Octaphenylcyclotetrasiloxane
Decamethylcyclopentasiloxane	

At the hearing on pesticides, in November 1962, a group of seven manufacturers of pesticides made a proposal concerning a list of biologically active materials for use in the manufacture of pesticide formulations. The companies were:

A.H. Howard Chemical Co. Ltd.	Orangeville, Ontario
Allied Chemical Services Ltd.	Calgary, Alberta
Chipman Chemicals Ltd.	Hamilton, Ontario
Gallowhur Chemicals Canada Ltd.	Lachine, Quebec
Manchester Products Ltd.	Galt, Ontario
Niagara Brand Chemicals	Burlington, Ontario
Green Cross Division	
Sherwin Williams Co. of Canada Ltd.	Montreal, Quebec

(1) Transcript, Vol. 80, p. 12264

The companies proposed:

"The signatories of this brief share the view of the Chemical Industry Committee that, when a biologically active chemical now on Appendix II, is made in Canada, it should become subject to the duty rates which have been recommended for the appropriate B.T.N. heading."(1)

The companies proposed duty-free entry for the materials until they are made in Canada.

The proposal was based on the belief that a duty on biologically active materials, not made in Canada, would increase the prices of pesticides to Canadian users without producing off-setting advantages for any segment of industry. The only product listed under the present heading is trichlorfon.

As noted above, the Industry Committee made a general proposal that products of the heading for which no other proposal had been made, should be dutiable at rates of 15 p.c., B.P., 20 p.c., M.F.N.

(1) Transcript, Vol. 108, p. 16333

HETEROCYCLIC COMPOUNDS; NUCLEIC ACIDS - B.T.N. 29.35

In the Explanatory Notes to the Brussels Nomenclature, the term "heterocyclic" is used to refer to organic compounds composed of one or more rings, and which contain in the rings, in addition to the carbon atom, atoms of other elements such as oxygen, nitrogen or sulphur. In this way, the following heterocyclic groups are derived:

- a) Five membered rings
- b) Six membered rings
- c) Other more complex heterocyclic compounds

The Industry Committee's statement noted that the nucleic acids referred to are complex organic chemicals which, when combined with proteins, form substances found in the nuclei of animal and vegetable cells.

Although a very large number of products classified by heading 29.35 were brought to the attention of the Board, only a few, individually, have substantial commercial importance in Canada and very few are made in this country. In total, the commercial value of Canadian consumption of the products of the heading is in excess of three million dollars; it could increase substantially if the monomer caprolactam became the starting point for production of nylon 6 in Canada.

Some products on which submissions were made under B.T.N. heading 29.37 have been re-classified in the B.T.N. to heading 29.35; the submissions on them are dealt with in this section of the report. However, one of these, Warfarin (3-(alpha-acetonylbenzyl)-4-hydroxycoumarin), was the subject of a submission at the hearing on pesticides of B.T.N. heading 38.11 and it is discussed in the section of the report on heading 38.11. In brief, Warfarin is made in Canada by Kent Chemicals Ltd., Vancouver, B.C. The company said it manufactured most of the Canadian requirements, importing, as necessary, the raw materials for its manufacture. These may now be entered duty-free under tariff item 791 and the company requested the continuation of this duty-free provision in an item, "Materials used in the chemical synthesis of Warfarin."(1)

Most of the products of the heading are used as rubber accelerators or antioxidants, in the manufacture of synthetic resins, for the manufacture of pharmaceutical or veterinary preparations, or for the manufacture of pesticides. The order of presentation below is generally the order in which the products were brought to the attention of the Board in the course of the public hearing.

The Procter and Gamble Company of Canada presented a brief on potassium dichloroisocyanurate which is not made in Canada but is imported from the United States for the manufacture of dry chlorine bleaches. At the time of the hearing in March 1962, it was not imported by Procter and Gamble, but the company expected soon to be an importer and others were then bringing it from the U.S.A. Imports were estimated

(1) Transcript, Vol. 109, p. 16547

at some 40,000 pounds, valued at about \$30,000. The company expressed the opinion that, because of the complexities of manufacture and the smallness of the Canadian market, it would not be made in this country. However, the material was expected to become "a significant, essential raw material to the manufacturers of dry chlorine bleach products."⁽¹⁾ Because the imposition of duties would not benefit any Canadian manufacturer at that time but would serve only to increase the company's costs, Procter and Gamble proposed that the duty-free status be continued. Should it become made in Canada, the company recommended rates of 15 p.c., B.P. and 20 p.c., M.F.N. At the time of the hearing it was said to be permitted duty-free entry under tariff item 219a(2), presumably because of disinfecting properties.

Similar arguments were used by Colgate Palmolive Limited in proposing duty-free entry for trichloroisocyanuric acid. This acid is not made in Canada but is imported from the United States for use in making bleaching and sanitizing products; it provides the chlorine which is the active ingredient in these products. Complexities of manufacture, together with the small domestic market, were said to make its production in Canada unlikely. At the time of the hearing, it was said to be permitted duty-free entry under tariff item 219a(2) and the company recommended that it remain duty-free because "the imposition of a duty on this material would not benefit any Canadian manufacturer and in addition would only serve to increase our costs."⁽²⁾

Opposition to the proposals on these two products, potassium dichloroisocyanurate and trichloroisocyanuric acid was voiced by Javex Company Limited, a subsidiary of Dominion Tar and Chemical Company Limited, on the ground that competitive products are made in Canada. Javex Company Limited sells three formulated dry bleach products in Canada, containing, as their main ingredients, dichlorodimethyl hydantoin, sodium perborate and potassium monopersulphate, respectively. The company uses sodium hypochlorite in its liquid bleaching product; this base material is the only one made in Canada. The company expressed its interest in three ingredients which are used in the United States and which are competitive with the ingredients used in Canada, sodium monopersulphate, potassium dichloroisocyanurate and lithium hypochlorite and recommended that "they receive equivalent tariff treatment",⁽³⁾ by which it meant rates of 15 p.c., B.P. and 20 p.c., M.F.N. Sodium hypochlorite in solution is named in tariff item 210i and is subject to rates of 15 p.c., B.P. and 20 p.c., M.F.N. The company's proposition is summed up as follows:

"If we were dealing solely with chemicals that were not made in Canada, our argument would simply be they should all have the same tariff treatment, and if the appropriate tariff treatment was thought to be free entry, that would be fine... We are, however, in an area where they are competing very directly with Canadian raw materials, and in particular sodium hypochlorite, and from that starting point it is our submission that the treatment on all of these should be the rates which are appropriate to sodium hypochlorite, which we have recommended should be 15 per cent British Preferential and 20 per cent most-favoured-nation, which are the rates which were prescribed by Parliament for this item at the last budget."⁽⁴⁾

(1) Transcript, Vol. 73, p. 11060

(2) Same, Vol. 73, p. 11070

(3) Same, Vol. 73, p. 11075

(4) Same, Vol. 73, p. 11083-4

The spokesman for the company added that this is an example of competition at the level of the end product when competition does not exist at the level of the raw material because the materials are not substitutable in a given formulating process.

Melamine was the subject of briefs by four companies and one association. It is a fine white crystalline powder which was not made in Canada at the time of the hearing, but is now ruled to be made in Canada. It is used in making pharmaceuticals, sterilizing agents, accelerators for rubber compounding, fire retardant compounds, plastic moulding compounds such as those for dinnerware, laminating resins, bonding resins, coating resins, textile resins and leather resins. Some 25,000 pounds annually were said to be used in making heavy duty detergents by Colgate Palmolive Limited.⁽¹⁾ Paint manufacturers were estimated to purchase about 100,000 pounds for the manufacture of resins for use in surface-coating products. Import data are not available, though imports of melamine crystals were estimated at about 300,000 pounds in 1961. The melamine content of the various resins and moulding compounds was said to be about $2\frac{1}{2}$ to 3 million pounds per year for all uses.⁽²⁾ One of the principal resins is melamine-formaldehyde used for baking enamels for appliances and automobiles, table and countertop laminates and high wet-strength paper products. The resins are dealt with in this report under B.T.N. Chapter 39.

At a price of 28 to 30 cents per pound, consumption of 3 million pounds would have a value of about \$900,000.

Proposals were submitted on melamine by Monsanto Canada Limited, Cyanamid of Canada Limited, Colgate Palmolive Limited, British Oxygen Chemicals Limited and the Canadian Paint Varnish and Lacquer Association (CPVLA). They noted that the chemical was then free of duty under tariff item 921, while ruled to be not made in Canada and when for use in making resins and that the resins are free of duty under item 901(a)2; moulding compounds are duty-free under item 902f. More generally, melamine was dutiable under tariff item 208t at Free, B.P., 15 p.c., M.F.N. Each of these companies and the CPVLA recommended that melamine should continue to be imported free of duty until it is made in Canada, at which time it should be subject to rates of 15 p.c., B.P. and 20 p.c., M.F.N. They said that it is not directly competitive with Canadian-made products and that any increase in the duty would result in higher costs for the consumer. Melamine has since been ruled made in Canada and is dutiable under tariff item 711 at 15 p.c., B.P., 20 p.c., M.F.N.

Furfural was the subject of a brief by The British American Oil Company Limited. Furfural is not made in Canada but is used in the manufacture of nylon, pharmaceuticals, fungicides, insecticides, preservatives and resins. It is used by the B.A. Oil Company as a selective solvent in the manufacture of lubricating oils and was said to be essential to prevent the formation of sludges harmful to engines and other operating equipment. The company noted that its refining facilities at Clarkson, Ontario, were designed to utilize furfural and that a major capital investment would be required to convert the refin-

(1) Transcript, Vol. 73, p. 11121

(2) Same, Vol. 73, p. 11108

ery to some other type of extraction agent. Furfural is named in tariff item 263b and is free of duty under both B.P. and M.F.N. Tariffs for use in the refining of oils. The company recommended that it continue duty-free until it is made in Canada.

The Quaker Oats Company submitted a brief, at the time of the end-use hearing on tariff item 921 in June 1963, on furfuryl alcohol.⁽¹⁾ Furfuryl alcohol is not made in Canada but the company said that if the demand were to increase sufficiently it "would be most interested in our Canadian company establishing manufacturing facilities in Canada."⁽²⁾ It is used in making resins and as a solvent; consumption in Canada in 1962 was estimated at under 500,000 pounds. It is imported from the United States free of duty under tariff item 921. "Continuing furfuryl alcohol on a duty free basis will provide maximum encouragement for market development and will hasten the day when a Canadian plant could become a reality", the company said.⁽³⁾ Quaker Oats recommended continued duty-free entry.

Another brief on this chemical by H.L. Blachford Limited also recommended free entry. This company uses furfuryl alcohol in making chemical resistant cements and said, "Duty free entry of the raw materials for this cement, makes it possible for us to compete with the finished resin cement, which is being imported duty free by our competitors."⁽⁴⁾ Imports of furfuryl alcohol in 1960 were valued at about \$46,000, in 1962 at about \$65,000 and in 1963 they were \$95,000.

Maleic hydrazide is made in Canada by Naugatuck Chemicals Division of Dominion Rubber Company Limited. It is used in formulations which in turn are used to control plant growth; it controls the growth of grass and shrubbery and inhibits certain unwanted growth in tobacco, potatoes and other vegetables. Currently maleic hydrazide is imported free under tariff items 791 when for use in making pesticides or under 219a when for use as a pesticide. Naugatuck recommended that it should be subject to rates of 15 p.c., B.P. and 20 p.c., M.F.N. and reiterated its general proposition that it:

"could not maintain our position as a manufacturer of chemicals in Canada if placed under a competitive disadvantage caused by higher duty rates on raw materials, unless we receive commensurate protection for the products which we make, and unless our customers receive commensurate protection for the formulations which they make."⁽⁵⁾

Chemical Specialties Association, a wholly owned subsidiary of Propas Chemical and Equipment Company Limited, opposed Naugatuck's proposal for maleic hydrazide, suggesting instead that it should continue to be imported free of duty. The company noted that until 1961 it had been able to obtain its supplies of this chemical from Naugatuck Chemicals but that from 1962 supplies were no longer available from this

(1) Transcript, Vol. 174, p. 28522

(2) Same, Vol. 174, p. 28523

(3) Same, Vol. 174, p. 28523

(4) Same, Vol. 174, p. 28525

(5) Same, Vol. 73, p. 11127

source. Formerly, the company maintained, it had provided an outlet for some 25 per cent of Naugatuck's production. Its spokesman said that it could not obtain supplies from the United States branch of Naugatuck Chemicals and indicated that new sources were being sought. In this connection he said:

"if a duty were to be imposed on this material, then at this future date when these materials were available we would be definitely jeopardized in our position and that the materials, instead of being freely available to us, would only be available to our competitors and not to ourselves. As a result, the market would be artificially higher."⁽¹⁾

Monsanto Canada Limited submitted a brief on a number of rubber accelerators, some of which are made in Canada and some of which are not; particular reference was made to N-cyclohexyl-2-benzothiazolesulphenamide, sold under the Monsanto trade name, Santocure. This chemical is used as a delayed action accelerator in making products from synthetic or natural rubber. Manufacture in Canada began in 1958 and imports dropped from an estimated \$230,000 in that year to about \$100,000 in 1959 with a further drop in the next year. It is currently imported under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N., and Monsanto recommended that these rates be continued.

The company recommended also that the rates on the following thiazoles and sulphenamides be 15 p.c., B.P. and 20 p.c., M.F.N. These are the existing rates on the thiazoles but the rates on the sulphenamides, under tariff item 208t, are Free, B.P. and 15 p.c., M.F.N. Imports of thiazoles in 1964 were about 1.3 million pounds, valued at \$941,000, an average value of 74 cents per pound. In terms of quantity, more than 60 per cent of the imports were from the U.K., the balance coming from the U.S.A. The chemicals mentioned by Monsanto are as follows:

Thiazoles

2 mercaptobenzothiazole
benzothiazyl disulphide
zinc mercaptobenzothiazole

Sulphenamides

N-oxydiethylene-2-benzo-thiazolesulphenamide
N-tert-butyl-2-benzothiazolesulphenamide
N,N-diisopropyl-2-benzothiazolesulphenamide
N,N-dicyclohexyl-2-benzothiazolesulphenamide

In recommending this rate of duty, the company said:

"A moderate tariff is also required to reserve a major portion of the domestic market for the Canadian producers so that their plants may be operated at maximum efficiency."⁽²⁾

(1) Transcript, Vol. 73, p. 11143

(2) Same, Vol. 73, p. 11161

Generally, Monsanto said that the chemicals listed above are competitive in their uses as rubber accelerators. These are discussed further, below, in connection with a brief by Naugatuck Chemicals.

Monsanto Canada Limited presented a brief on ethylene thiourea, also known as 2-mercaptoimidazoline, which the company produces in Canada. It is used as an accelerator in the compounding of neoprene and as a tarnish inhibitor, added to dishwashing soap and detergent products. At the time of the hearing, it was imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N., but the company recommended that it be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N. For a time after the hearing, it was ruled made in Canada and dutiable under item 711 at the rates proposed by Monsanto. In February, 1966 it reverted to a "not-made" under tariff item 208t. As a result, it may also be imported free of duty under item 921 when for use in the manufacture of synthetic resins and plastics.

A proposal on 6-ethoxy-1,2-dihydro-2,2,4-trimethylquinoline was made by Monsanto Canada Limited. It is made in Canada and is used as an antioxidant and as an antiozonant in rubber products and as an antioxidant in animal feeds; the product used for the latter purpose is put through a purifying stage beyond that necessary for rubber. Rubber products were said to consume the greater volume in Canada, and in this use it meets competition from 6-dodecyl-1,2-dihydro-2,2,4-trimethylquinoline, a product not made in Canada. Both of these chemicals are dutiable under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. As in its earlier submissions on rubber accelerators, Monsanto Canada requested rates of 15 p.c., B.P. and 20 p.c., M.F.N. for 6-ethoxy-1,2-dihydro-2,2,4-trimethylquinoline for all applications and also that "other amine-acetone reaction products falling in Brussels 29.35 and those not chemically defined falling in 38.19 be dutiable at the same rate." (1)

Naugatuck Chemical Division also presented a brief on 6-ethoxy-1,2-dihydro-2,2,4-trimethylquinoline, which it makes at Elmira, Ontario. The company recommended the same rates as did Monsanto, 15 p.c., B.P. and 20 p.c., M.F.N., and repeated its statement on commensurate protection:

"we could not maintain our position as a manufacturer of chemicals in Canada if placed under a competitive disadvantage caused by higher duty rates on raw materials, unless we receive commensurate protection for the products which we make." (2)

As noted above, Naugatuck Chemicals Division of Dominion Rubber Company Limited presented a brief on some of the thiazoles and sulphenamides that were the subject of a presentation by Monsanto Canada Limited. The Naugatuck brief dealt with the following chemicals specifically:

(1) Transcript, Vol. 73, p. 11198

(2) Same, Vol. 74, p. 11217

2-mercaptobenzothiazole
 zinc mercaptobenzothiazole
 benzothiazyl disulphide
 N-cyclohexyl-2-benzothiazole sulphenamide

These chemicals are made at Elmira, Ontario, by Naugatuck Chemicals. They are all used as accelerators in conditioning natural and synthetic rubbers. The current rates of duty under tariff item 711 are 15 p.c., B.P. and 20 p.c., M.F.N. and the company recommended that these rates should continue. In this recommendation, the company is in agreement with Monsanto.

The Rubber Association of Canada took exception to these proposals for chemicals used as accelerators and antiozonants or antioxidants in the manufacture of rubber products. The Association's brief said:

"We wish to register strenuous objection to the recommendations contained in the above-mentioned briefs from Monsanto Canada Limited, that all rubber anti-oxidants and/or antiozonants falling under Brussels headings 29.35 and 38.19, and all rubber accelerators falling under Brussels heading 29.35 and 38.15, be made dutiable at the rates of B.P. 15 per cent; M.F.N. 20 per cent, regardless of whether made in Canada or not made in Canada. In our opinion implementation of these recommendations would unduly hamper the intense competitive research and experimentation with new and different compounding chemicals which has been a key factor in the outstanding improvements in product quality and performance which the rubber industry has achieved through the years."(1)

Specifically, the Association objected to Monsanto's statement that 6-ethoxy-1,2-dihydro-2,2,4-trimethylquinoline, which is made in Canada by Monsanto, is competitive with 6-dodecyl-1,2-dihydro-2,2,4-trimethylquinoline and polymerized 1,2-dihydro-2,2,4-trimethylquinoline, which are not made in Canada. The Association claimed that the functions of these chemicals are different in ways important to the rubber industry.

Similarly, the Association maintained that N-tert-butyl-2-benzothiazolesulphenamide is different in its function from the other thiazoles and sulphenamides grouped by Monsanto in its request for identical rates of duty.(2) The Association's brief noted that this chemical is not made in Canada but is imported mostly from the Monsanto Chemical Company and Naugatuck Chemicals in the United States under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N., and requested that the rates of duty currently in effect should be maintained.

The accelerators of B.T.N. heading 38.15 are mixtures or preparations usually incorporating, as active ingredients, one or more of the single chemicals of heading 29.35 or other headings. The preparations are discussed further under B.T.N. heading 38.15, where it is noted that the two manufacturers of rubber accelerators in Canada proposed rates of 15 p.c., B.P., 20 p.c., M.F.N. for them. For the preparations, the Rubber Association took no exception with these proposed rates, noting that they were the existing rates.

(1) Transcript, Vol. 73, p. 11173

(2) Same, Vol. 73, p. 11172

The Rubber Association of Canada also recommended that the current duty-free status of N-methyl morpholine under tariff item 921 should be continued as long as it is ruled of a kind not produced in Canada. The proposal said that the rubber industry "uses a fairly considerable quantity of this chemical in the production of polyurethane foam."(1)

Polymer Corporation Limited listed vinyl pyridine as a chemical in which it is interested as a consumer in the production of synthetic rubber, noting for this chemical as for others that: "we consider it essential the tariff provision in respect of materials for use in the manufacture of synthetic rubber, now contained in item 851, be continued..."(2)

Two chemicals used in the production of coloured pigments were brought to the attention of the Board by the Canadian Color Makers Association. They are 1-phenyl-3-methyl-5-pyrazalone and 1-phenyl-3-carbethoxy-5-pyrazalone. These chemicals are not made in Canada but are imported from West Germany and the United States under tariff item 203f, free of duty. There was no other statement on these products.

Fine Chemicals of Canada Limited submitted a brief on three chemicals used as tranquilizers which it makes in Canada. The first is currently dutiable under item 208t at rates of Free, B.P. and 15 p.c., M.F.N., while the others are dutiable under item 711 at 15 p.c., B.P. and 20 p.c., M.F.N. The company recommended that the rates for all three should be 15 p.c., B.P. and 20 p.c., M.F.N. There was no opposition. The chemicals are:

adrenochrome semicarbazone
promazine hydrochloride
chlorpromazine hydrochloride

Hoffman-LaRoche Limited proposed that hydroxy methyl dibromomethyl pyridine be free of duty under all Tariffs. This material is imported for use in making Vitamin B6 for which the company satisfies most of the Canadian demand. It is currently dutiable under item 208t at rates of Free, B.P. and 15 p.c., M.F.N., and the company requested free entry in order to enable it to meet foreign competition for vitamin B6.

Smith, Kline and French Inter-American Corporation submitted a brief on the following chemicals, proposing that the current rates of duty under tariff item 208t, Free, B.P. and 15 p.c., M.F.N. be maintained. The chemicals are:

dimethisoquin
2-trifluoromethylphenothiazine
trifluoperazine dihydrochloride
1-methyl-4-(3-chloropropyl)-piperazine

(1) Transcript, Vol. 74, p. 11228

(2) Same, Vol. 74, p. 11231

Three chemicals, not made in Canada but used here in the formulation of pharmaceuticals, were included in a presentation under heading 29.35 by Charles E. Frosst and Company. In addition, the last two products in the list below, since re-classified to heading 29.35 from heading 29.37, were the subject of a similar presentation by the company under the latter heading. All of these chemicals are currently dutiable under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. The company suggested that, from the standpoint of the consumer and the Canadian manufacturer of pharmaceutical preparations, there is "no sound economic justification for any increase in the existing rates of duty." (1) The chemicals are as follows:

carbinoxamine maleate
dextromethorphan hydrobromide
propyl thiouracil
methaqualone hydrochloride
bishydroxycoumarin

In presenting a brief on a number of chemicals, Pfizer Canada noted that, while it had recommended that the Board should seek to create a climate more favourable to the manufacture of chemicals in Canada, the company takes the position that "no useful purpose would be served by imposing duties on chemicals of a 'class not made in Canada' which the company uses in its operations or which it imports for resale. The restriction of such activities would not only deprive the company of profits which it now earns but such restrictions would also delay the development of markets in Canada to levels which would justify manufacture in Canada." (2) In accord with this statement, Pfizer requested that the chemicals listed below be dutiable at rates of Free, B.P. and 15 p.c., M.F.N., the rates currently in effect under item 208t. The chemicals are:

hydroxyzine
meclizine hydrochloride
nialamide
oxyphencyclimine hydrochloride
tetrahydrozoline hydrochloride
glucona delta lactone
(previously heading 29.37)

John Wyeth and Brother (Canada) Limited recommended that there be no increase in the rates of duty on the following chemicals until a substantial portion of Canadian requirements is available from Canadian production; there is no domestic manufacture and the chemicals are currently dutiable under item 208t at rates of Free, B.P. and 15 p.c., M.F.N. The company's recommendation covered the following:

antipyrene
dextromethorphan hydrobromide
ethoheptazine citrate
histamine dihydrochloride
pethidine hydrochloride
promethazine hydrochloride

(1) Transcript, Vol. 74, p. 11257

(2) Same, Vol. 74, p. 11267

Robinson Brothers Limited proposed that, since the following chemicals are not made in Canada, the rates of duty currently in effect under tariff item 208t, Free, B.P. and 15 p.c., M.F.N. should be retained. One of the chemicals listed here, ethylene thiourea, has been dealt with in connection with a brief from Monsanto Canada Limited, where it was noted that it is not made in Canada. The Robinson Brothers list of chemicals is as follows:

Piperidinium pentamethylene dithiocarbamate
 Cadmium pentamethylene dithiocarbamate
 Lead pentamethylene dithiocarbamate
 Nickel pentamethylene dithiocarbamate
 Sodium pentamethylene dithiocarbamate
 Zinc pentamethylene dithiocarbamate
 Zinc pentamethylene dithiocarbamate - piperidine complex
 Sodium dimethyl pentamethylene dithiocarbamate
 Zinc dimethyl pentamethylene dithiocarbamate
 Dipentamethylene thiuram disulphide
 Dipentamethylene thiuram monosulphide
 Dipentamethylene thiuram tetrasulphide
 Piperidine. N. Ethyl Piperidine
 2 Methyl Piperidine. 2-Piperidinoethanol
 1,2,5,6-Tetrahydropyridine
 N. Methyl Morpholine. N. Ethyl Morpholine
 Ethylene Thiourea, (2-Mercapto Imidazoline)
 Tetrahydrothiophene
 Ethylene bis thiuram monosulphide
 Furfurylamine. Tetrahydrofurfurylamine
 N. Methyl Furfurylamine
 N. Methyl Tetrahydrofurfurylamine
 1,2,3,4-Tetra hydroquinoline
 Cupric Pentamethylene Dithiocarbamate
 N. Methyl Piperidine. 4-Methyl Piperidine
 Methylene Dipiperidine
 N.-Nitrosopiperidine
 N. Methyl 1,2,5,6-Tetrahydropyridine
 N. Ethyl 1,2,5,6-Tetrahydropyridine
 1,4-Thioxane. N,N'-Difurfuryl thiourea

A proposal for duty-free entry was made for the following list of chemicals by a group of seven manufacturers of pesticides in a joint statement at the hearing of November 21, 1962, on pesticides. The products are materials used in the formulation of pesticides and free entry was requested for them "for use in the manufacture of goods described by Brussels Heading No. 38.11, and when not made in Canada." (1) The general submission is dealt with in the part of the report on pesticides of heading 38.11.

Bis butenylene tetra-hydro furfural
 Butopyronoxyl
 Chlorbis (ethylamino) triazine
 2-Chloro-4-ethylamino-6-isopropylamino-s-triazine
 "Diazinon"
 Dichloro chloranilino triazine

(1) Transcript, Vol. 108, p. 16332

Diethyl chloromethylcoumarinyl thiophosphate
 Dimethyl diaminotriazinylmethyl dithiophosphate
 1:1'-Dimethyl-4,4'-dipyridylum dichloride
 Dimethyl oxobenzo triazinomethyl dithiophosphate
 Dimethyl tetrahydrothiadiazine thione
 Dipropyl iso cinchomeronate
 1:1'-Ethylene-2:2'-dipyridylum dichloride
 Glyodin
 Methyl mercury oxinate
 Rotenone
 Thiodan

The Canadian Pharmaceutical Manufacturers Association submitted to the Board a list of chemicals used by its members in the manufacture of pharmaceutical products and recommended that some end-use treatment be adopted for these chemicals when so used. The Association recommended rates of Free, B.P. and 15 p.c., M.F.N. when the chemicals are not made in Canada and that the heading rates proposed by the Industry Committee (15 p.c., B.P. and 20 p.c., M.F.N.) should apply when the products are made in Canada. The chemicals in the present heading, the more important marked by an asterisk, to which this proposal applies are:

Acepromazine maleate
 6-Allyl-6,7-dihydro-5H-dibenz (c,e) azepine *
 dl-alpha-1,3-dimethyl-4-propionoxy piperidine hydrochloride *
 1-benzyl-2-(5-methyl-3-isoaxolylcarbonyl hydrazine) *
 Beta pyridyl carbinol tartrate
 Carbinoxamine maleate 2-(p-chloro-a(2-dimethylaminoethoxy)benzyl)pyridine maleate *
 Chlorcyclizine monohydrochloride *
 Chlorpheniramine maleate (3-(4-chloro-phenyl)1-2-pyridyl-3dimethylamino-propane maleate *
 2-chloro-9-(3-dimethyl-amino propylidene)-thioxanthene *
 7-chloro-2-methylamino-5-phenyl-3H-1,4 benzodiazepine-4-oxide hydrochloride *
 Cyclizine monohydrochloride *
 Dextro-chlorpheniramine dextro-2-P-chloro-(2-dimethylaminoethyl) benzyl pyridine maleate
 Dihydrochloride of 2-dimethylamine-6-(betadimethylamino-ethoxy)-benzothiazole
 Diiodohydroxyquinoline USP dark *
 3,3-diethyl-1-2,4-dioxo-piperidine *
 Dimethisoquin
 Dimethoxanate hydrochloride *
 4-dimethylamino-1,5-dimethyl-2-phenyl-3-pyrazalone *
 d-3,4(1',3'-dibenzyl-2'-keto-imidazolidine)-1,2-trimethylene thiopanium d-camphor-sulfonate
 Ethoheptazine
 5-Fluorouracil *
 Hexocyclium
 Histamine diphosphate
 1-histidine monohydrochloride
 Hydroxy-methyl dibromomethyl pyridine *
 3-hydroxy-1-methyl-pyridinium bromide *
 Hydroxyzine;1-(P-chloro-a-phenylbenzyl) 4-(2 hydroxyethoxyethyl piperazine) (T.M. Atarax) *

Izothipendyl hydrochloride
 Isonicotinylhydrazine *
 1-isonicotinyl-2-isopropyl hydrazine *
 Meclizine HCL 1-(chlorobenzylhydrazyl)-4-(~~m~~-methyl benzyl) Piperazine
 dihydrochloride (T.M. Bonamine/Bonadoxin) *
 Meperidine hydrochloride *
 2-methyl-9-phenyl-tetrahydro-1 pyridindene hydrogen tartrate *
 1-methyl-4(3-chloropropyl) piperazine
 Methapyrilene fumarate
 Methapyrilene
 Nialamide; N-isonicotinoyl-N-B-(N-benzylearboxamide) ethyl hydrazine
 (T.M. Niamid) *
 2-oxo-3-isobutyl-9,10-dimethoxy-1,3,4,6,7,11, b-hexaydro-2H-benzo
 (a) quinolizine
 Oxypheycyclimine HCL; 1-methyl-1,4,5,6,-tetrahydro-2-pyrimidyl-methyl
 a-cyclohexyl-a-phenyglycolate hydrochloride *
 Paramethadione
 Perphenazine 1-(2-hydroxyethyl)-4-(2-chloro-10-phenothiazinyl) propyl)
 piperazine
 Pheniramine 1-phenyl-1-(2 pyridyl)-3-dimethylaminopropane
 1-phenyl-2,3-dimethyl-4-isopropyl-5-pyrazolon *
 Primidone
 Bishydroxycoumarin
 Glucone delta lactone *
 3-(1'-phenylpropyl)-4-hydroxycoumarin *
 3-3-diethyl-5-methyl-2,4,piperidine dione *
 Piperazine hexahydrate *
 Pramoxine HCL
 Procyclidine hydrochloride *
 Promazine hydrochloride *
 Promethazine
 Propyl thiouracil *
 Querocetin
 Tetrahydrozoline; 2-(1,2,3,4-tetrahydro-1-naphthyl)-2-imidazoline
 hydrochloride T.M. Tyzine) *
 2-Trifluoromethylphenothiazine
 Trifluoperazine dihydrochloride-10-(3-(1-methyl-4-piperazine) propyl)-
 2-trifluoromethylphenothiazine
 Trimethadione
 Triprolidine hydrochloride *
 Thioridazine hydrochloride (T.M. Mellaril)
 Acriflavine
 Amidopyrin
 Aminacrine hydrochloride *
 2-Aminothiazole
 2-Aminothiazoline
 2-p-Chlorobenzylpyridine
 7-Chloro-4-hydroxyquinoline
 Cyclizine hydrochloride
 Dextromethorphan hydrobromide *
 2:3-Dihydroxyquinoxaline
 6:6'-Dimethyl-2:2'-pyridoin
 Diphenylpyraline hydrochloride
 Dipipanone hydrochloride
 Ethionamide
 Histamine
 Histamine dihydrochloride

N-2-Hydroxyethylpiperazine
 mesoInositol hexanicotinate
 Isoniazid
 Methyl isonicotinate
 Methyl nicotinate
 1-Methylpiperazine
 6-Methyl-2-thiouracil
 Naphazoline hydrochloride
 Naphazoline nitrate
 isoNicotinic acid
 Nicotinmethyleamide
 Nikethamide
 Pethidine
 Pethidine hydrochloride *
 Phenazone
 Phenothiazine
 Phentolamine hydrochloride
 Phenylbutazone
 Piperazine adipate *
 Piperazine dihydrochloride
 Piperocaine hydrochloride
 Proflavine sulphate
 Promethazine hydrochloride
 6-n-Propylthiouracil
 Pyrazinamide
 Pyridine *
 Pyridine-2:6-dialdehyde
 Tetrahydrofuran
 Thiophen
 Thiouracil
 Thonzylamine hydrochloride
 Tolazoline hydrochloride
 Tricyclamol chloride
 Trifluoropiperazine dihydrochloride
 2-Trifluoromethylphenothiazine
 Trimethidinium methosulphate
 Tripelennamine citrate
 Tripelennamine hydrochloride

The Industry Committee noted that an earlier interest had been expressed in morpholine and N-acyclolaminoformylmethylpyridinium chloride but that no briefs were presented on these chemicals because of their slight commercial importance. However, imports of morpholine were reported to be valued at \$300,000 in 1963; in 1964 quantity data also became available, and in that year over 522,000 pounds were imported, valued at \$202,000, an average value of 39 cents per pound. All of the imports in 1964 were from the U.S.A.

Caprolactam

At the time of the hearing, caprolactam was classified by the Brussels Nomenclature in heading 29.37; it has since been reclassified to heading 29.35.

Caprolactam is a white, crystalline solid produced from cyclohexanone, one of the chemicals made when cyclohexane is reacted with air. Its use is as an intermediate in the manufacture of nylon 6. Since it can be readily packaged, shipped and stored, it is "traded internationally on an extensive scale."(1)

Caprolactam was not made in Canada at the time of the hearing, but the nylon 6 made from it is so similar to the nylon 6/6 made from hexamethylene diammonium adipate that the salts themselves are considered competitive by some companies. Courtauld's Canada Synthetic Fibres Limited makes nylon 6 fibre from polycaprolactam imported from Europe and Union Carbide Canada Limited intends to use imported caprolactam in its plant under construction at Arnprior, Ontario, to make nylon 6. With respect to the competitive threat, Du Pont of Canada said:

"Caprolactam poses a serious competitive threat to the Canadian production of nylon 66 salt... Although the process employed in the manufacture of caprolactam differs from that of nylon 66 salt, they can be made from the same raw materials...and the two nylon polymers bear a close chemical relationship to each other...Because only one stage, polymerization, separates either nylon 66 salt or caprolactam from the polymers used in their respective spinning operations, it follows that the competition between the two intermediate chemicals is determined by the extent of the interchangeability of nylon 6 and nylon 66 in the fibres, fabrics and moulded articles, which are end products...The ability to shift from one type to another is facilitated by the fact that textile manufacturers, by far the largest outlet for nylon 6 and nylon 66, can produce fabrics from both types of nylon yarn on the same machinery at comparable costs."(2)

The situation with respect to the polymers is discussed in the section of the report on B.T.N. heading 39.01.

When caprolactam is to be used in the manufacture of synthetic resins it may be imported free of duty under tariff item 923, in which it is specifically named; more generally it may be imported under item 208t at rates of Free, B.P. and 15 p.c., M.F.N.

Du Pont of Canada Limited recommended that caprolactam be dutiable at rates of 25 p.c., B.P. and 30 p.c., M.F.N. B.F. Goodrich Canada Limited, in a letter to the Board, said:

(1) Transcript, Vol. 74, p. 11304

(2) Same, Vol. 74, p. 11304-5

"It is our opinion that these rates $\sqrt{25}$ p.c., B.P. and 30 p.c., M.F.N.] are excessively high and we would like to register our objection to such. It is our belief that the rate of duty on caprolactam should be equal to or possibly slightly lower than the prevailing rate for nylon filament, to which tariff item 561c currently applies. We base our view on the theory that basic raw materials should not be faced with a higher rate of duty than the finished product. We do not look with favour on the establishment of 'duty-free' tariff for this material, even though it may not be currently manufactured in Canada." (1)

Tariff item 561c, mentioned in the above quotation, bears rates of $7\frac{1}{2}$ p.c., B.P. and $12\frac{1}{2}$ p.c., M.F.N. with a minimum of 11 cents per pound.

Courtaulds recommended that caprolactam be imported free of duty until Canadian production is available, at which time the company would not object to rates reasonable in relation to those of the fibres and yarns made from it. Union Carbide suggested that caprolactam be subject to rates of 5 per cent under both B.P. and M.F.N. Tariffs.

Du Pont's arguments in favour of higher tariff rates, centering on the desirability of ensuring that nylon intermediates are produced in Canada, are dealt with under heading 29.22 in a general section dealing with tariff arguments for nylon intermediates.

The company's position was that these rates were necessary to safeguard Canadian production of the polymer, together with all of the investment in facilities to produce the intermediate chemicals leading up to the polymerization stage. The same protection should be given to the intermediates to prevent their importation which would largely negate the protection of the polymer.

Union Carbide pointed out that nylon 6 filaments compete directly with nylon 6/6 filaments and both types compete with other synthetic fibres made in Canada. The company also suggested, going one stage back in the process, that nylon 6 resin (polycaprolactam) competes directly with nylon 6/6 resin in some applications. The company, however, did not consider that the monomer, caprolactam, competes directly with the nylon 6/6 salt. This, the company thought, was pursuing competitiveness too far back. The company observed that, "It does not appear reasonable, however, that because two products compete directly that all raw materials entering into their manufacture and, in turn, into the manufacture of the raw materials ad infinitum should be considered as competing." Union Carbide expressed the idea that its proposed rate of 5 p.c. "would encourage monomer production as soon as the market develops to a point where production facilities can be economically justified." (2) Courtaulds could see no justification for a 5 p.c. duty on the monomer while it is not produced in Canada.

(1) Transcript, Vol. 74, p. 11341-2

(2) Submission by Union Carbide Limited, p. 2, received May 29, 1964

In a statement to the Board following the public hearing, Courtaulds stated that:

"The concern expressed by Du Pont about the competitive dangers from caprolactam intermediates and complete lack of any concern about the duty free entry of equally competitive intermediates suggests that the rates of duty proposed are designed as much to offset potential competition due to technological developments as to equate the cost of efficient Canadian production with the cost of similar production abroad."(1)

In replying to Union Carbide, Du Pont of Canada Limited said:

"just one stage in the production process, that of heating under pressure, separates caprolactam from polycaprolactam. Yet Union Carbide recommends to the Board that the two materials be treated quite differently for tariff purposes. It is difficult, indeed, to support the logic of a proposal that would leave most stages in the production of nylon intermediates unprotected, and make the final one subject to tariff treatment."(2)

In reply to Courtaulds' suggestion that technological changes were the cause for concern, Du Pont of Canada replied:

"we would like to reiterate that we know of no actual or potential technological advances with respect to nylon 6 which would cause us to alter our statements made before the Board."(3)

The statements to which reference was made were those emphasizing that Du Pont of Canada is "in the vanguard of technological advances."

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- (1) Submission by Courtaulds Synthetic Fibres Limited to the Tariff Board Regarding the Tariff Treatment Appropriate to Raw Materials for the Production of Nylon 6 Fibres and Yarns, February 11, 1964, p. 5
 - (2) A Reply by Du Pont of Canada Limited to the Submission of Courtaulds Canada Synthetic Fibres Limited and Union Carbide Canada Limited to the Tariff Board on Caprolactam and Polycaprolactam, December 14, 1964, p. 5
 - (3) Same, p. 4

SULPHONAMIDES - B.T.N. 29.36

Many of the sulphonamides are used in medicine and in powerful bactericides. The Industry Committee expressed the opinion that all chemicals of this heading which currently had commercial significance had been dealt with in submissions before the Board, and recommended that any other chemicals of this heading be assigned rates of duty suggested for the heading, 15 p.c., B.P. and 20 p.c., M.F.N. The value of the chemicals of this heading are an insignificant part of the value of the chemicals of Chapter 29 as a whole.

Fine Chemicals of Canada Limited submitted a brief on chlorpropamide which the company said it was manufacturing in sufficient volume to satisfy Canadian requirements. It was said to be an important new oral anti-diabetic agent and, at the time of the hearing, was dutiable under item 208t at rates of Free, B.P. and 15 p.c., M.F.N. The company requested rates of 15 p.c., B.P. and 20 p.c., M.F.N. Since that time it has been ruled made in Canada and is dutiable under item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N., the rates proposed by the company.

Naugatuck Chemicals Division of Dominion Rubber Company Limited presented a proposal for sulphamethazine (veterinary), sodium sulphamethazine (veterinary), made by the company at Elmira, Ontario and sulphaguanidine. None of the products is ruled made in Canada for Customs purposes; they are imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. Naugatuck reiterated its statement that the company "could not maintain our position as a manufacturer of chemicals in Canada if placed under a competitive disadvantage caused by higher duty rates on raw materials, unless we receive commensurate protection for the products which we make."(1)

Naugatuck recommended rates of 15 p.c., B.P. and 20 p.c., M.F.N. for sulphamethazine and sodium sulphamethazine. With respect to sulphaguanidine, in which the company is interested as a consumer, its brief said:

"We take no issue with the rates which are being proposed to you by the producers of these materials, provided the Board also recommends those rates which will be proposed to you for the products which we manufacture."(2)

Sulphaguanidine was the subject of no other presentation and no tariff proposal was made concerning it.

Charles E. Frosst and Company submitted a brief on sulphadiazine, used in the preparation of several important pharmaceutical products. It is made in Canada and is dutiable under item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. The company agreed that these rates represent "reasonable levels of duty protection" and that a higher rate would not be in the best interests of the Canadian public.(3)

(1) Transcript, Vol. 74, p. 11278

(2) Same, Vol. 74, p. 11291

(3) Same, Vol. 74, p. 11292

The company also submitted a brief on sulphathiazole, sulphamerazine and sulphamethazine, all of which it said are of major importance in the preparation of pharmaceutical products. They are ruled not made in Canada and the company noted that any increase in the rates of duty would add to the cost of the final products. They are dutiable under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. Charles E. Frosst maintained that there "is no sound economic justification for any increase in the existing duty rates" but added that if the products should become made in Canada, the company would support rates of 15 p.c., B.P. and 20 p.c., M.F.N.

Pfizer Canada requested that benzthiazide (also noted below with the C.P.M.A. brief) be dutiable at rates of Free, B.P. and 15 p.c., M.F.N., saying that no useful purpose would be served by imposing duties on chemicals of a class not made in Canada which the company uses in its operations or which it imports for resale.

The Canadian Pharmaceutical Manufacturers Association submitted to the Board a list of chemicals used by its members in the manufacture of pharmaceutical products and recommended that some end use treatment be adopted for these chemicals when so used. The Association recommended that rates of Free, B.P. and 15 p.c., M.F.N. should apply when the chemicals are not made in Canada and that the heading rates proposed by the Industry Committee (15 p.c., B.P. and 20 p.c., M.F.N.) apply when they are made in Canada. The list of chemicals in the present heading to which this proposal applies, with the more important chemicals marked by an asterisk, is as follows:

Bendrofluazide	Sulphadiazine*
Benzthiazide*	Sulphadimethoxine*
Chloramine T	Sulphaethylthiadiazole
Chlorothiazide	Sulphamerazine*
Chlorpropamide*	Sulphamethazine
Formylsulphathiazole	Sulphamethizole
Halazone	Sulphamethylthiadiazole*
Hydrochlorothiazide*	Sulphanilamide*
Methyclothiazide	Sulphapyridine
Phthalylsulphathiazole	Sulphasomidine
Probenecid	Sulphathiazole*
Sodium sulphamethazine*	Sulphathiazole sodium
Succinylsulphanilamide sodium	Tolbutamide*
Succinylsulphathiazole	2-4-dimethoxy-6-sulphanilamide-
Sulphacetamide	1,3-diazine*
Sulphacetamide sodium	3,4-dimethyl-5-sulphanilamide
	isoxazole*
	N1-acetyl-3,4-dimethyl-5-
	sulphanilamide isoxazole*

SULTONES AND SULTAMS - B.T.N. 29.37

Sultones and sultams are the internal esters and amides, respectively, of hydroxysulphonic and aminosulphonic acids. At the time of the public hearing, the heading included lactones and lactams as well as the sultones and sultams. The only chemicals brought to the Board's attention under this heading were the lactones and lactams subsequently transferred to heading 29.35 in the Brussels Nomenclature; they have, accordingly, been dealt with there. No products of known commercial importance in Canada remain under the present heading.

The Industry Committee noted that:

"Although some other products had been listed, they do not appear to have sufficient importance for any company to come forward at this time with recommendations. In these circumstances the Committee recommends that such other products be accorded tariff treatment by the classification and rates of duty for Heading No. 29.37."⁽¹⁾

The heading rates recommended were 15 p.c., B.P. and 20 p.c., M.F.N.

(1) Transcript, Vol. 74, p. 11298

PROVITAMINS AND VITAMINS, NATURAL OR REPRODUCED BY
SYNTHESIS (INCLUDING NATURAL CONCENTRATES), DERIVATIVES THEREOF
USED PRIMARILY AS VITAMINS, AND INTERMIXTURES OF THE FOREGOING,
WHETHER OR NOT IN ANY SOLVENT - B.T.N. 29.38

Vitamins are essential to the proper functioning of human and other animal organisms. They are usually of complex chemical composition and, as they cannot be synthesized by the human body, they must be obtained in final or nearly final form (provitamins) from outside sources. Effective in relatively minute quantities, their absence results in deficiency diseases.

According to the notes to the Brussels Nomenclature, the products listed below are excluded from heading 29.38 because, though they are sometimes called vitamins, their vitamin activity is of secondary importance in relation to other uses. They are:

Vitamin C₂ or P, of which examples are citrin, hesperidin, rutin and aesculin (B.T.N. 29.41)

Meso-inositol, myo-inositol, i-inositol or meso-inosite (B.T.N. 29.05)

Vitamin F, of which examples are linoleic or linolic acid, linolenic acid, arachidonic acid (B.T.N. 15.10)

Vitamin H₁, which is para-aminobenzoic acid (B.T.N. 29.23)
Choline or bilineurine (B.T.N. 29.24)

The heading also excludes synthetic substitutes for vitamins such as Vitamin K₃, K₅, K₆ and phthiocol and cysteine, as well as xanthophyll, sterols other than ergosterol; these are classified elsewhere in B.T.N. Chapter 29. Medicaments, including preparations containing vitamins, falling within heading 30.03 are, of course not in this heading.

However, the heading includes provitamins, whether natural or reproduced by synthesis and their derivatives of similar vitamin activity. It includes vitamin concentrates (enriched forms of vitamins) which may be used as such or may be worked up for isolation of the vitamin. Also included are intermixes of vitamins, of provitamins or of concentrates. The dilution of any of these products in any solvent, or the addition of anti-oxidants, does not exclude them from the heading.

Comprehensive data are unavailable to indicate the commercial importance of the products of the heading, but the available information indicates that the value of their consumption in Canada, in bulk form not packaged for retail, would be in excess of five million dollars annually; because this information is incomplete, the value of consumption might be well in excess of that amount. Vitamin A and its esters, vitamin C and the various forms of vitamin B are the products of chief commercial importance in Canada. Part of the market requirements of these vitamins is supplied from Canadian production and part is imported; most of the remaining products of the heading are supplied by imports.

Vitamin A is dealt with first in the following report, after which the other chemicals which came to the attention of the Board are discussed. The table on imports is given immediately below because of its general application to the report. It will be observed that it does not conform precisely to the chemicals named later because some chemicals combine to become one vitamin.

Canadian Imports of Vitamins, 1963

<u>Product</u>	<u>Imports</u>	
	1000 lb.	\$1000
Vitamin A	..	820
Vitamin A acetate	..	230
Vitamin A palmitate	..	425
Vitamin A and D combinations	..	85
Vitamin B ₁ (thiamine hydrochloride thiamine mononitrate)	..	130
Vitamin B ₂ (riboflavin)	..	398
Vitamin B ₁₂	..	200
Vitamin B complex (niacin: nicotinic acid)	229	245
Vitamin B complex (niacinamide: nicotinamide)	..	90
Vitamin B complex (pantothenic acid, pantothenol and its salts)	..	55
Vitamin B complex (not further identified)	..	150
Vitamin C (ascorbic acid, isoascorbic acid, and their salts)	..	1,032
Vitamin D ₂ and D ₃	..	80
Vitamin E (D-alpha-tocopherol acetate and succinate, mixed tocopherols)	..	170
Vitamin K (4-amino-2-methyl-1-naphthol hydrochloride; 2-methyl-3-phytyl-1,4-naphthoquinone; menadione diphosphate-tetrasodium salt; menadione sodium bisulphite)	..	55
Vitamin products, combinations, n.o.p.	..	<u>575</u>
Total of above		4,737

Source: Chemical Import Trends, 1963 Supplement, p. 36-7

Vitamin AThe Product

Vitamins, required in very small quantities for an adequate diet, are organic substances that occur in various foods. The word "vitamin A" is a group expression designating provitamin A; vitamin A₁ as an alcohol, an aldehyde or an acid; vitamin A₂ as an alcohol or an aldehyde; and the esters, vitamin A acetate and vitamin A palmitate. All of these are encompassed by the name vitamin A, and all are biologically active. When these forms of vitamin A oxidize they lose their biological activity. Biological activity or potency is measured in International Units and the alcohol is the most potent form; 0.3 micrograms of vitamin A alcohol is the equivalent of one international unit, but 0.344 micrograms of vitamin A palmitate is required to give the same potency.

The animal body cannot produce vitamins directly, but it can do so from provitamins; hence, vitamins or provitamins must be supplied to it. Provitamins A are alpha, beta and gamma carotenes and cryptoxanthin, orange or red crystals occurring in carrots, palm oil, eggs and butter. They oxidize readily on contact with air and are soluble in vegetable oils and in benzene.

Vitamin A₁ is a yellow solid which may be oily at room temperature but forms yellow crystals when cooled. It is unstable in air, has a melting point of 62-64°C, is soluble in fats and most organic solvents but is insoluble in water. Although it may be synthesized, it is found in nature as an alcohol or as fatty acid esters, in animal products, salt-water fish (from whose livers it may be extracted commercially) and in eggs.

Vitamin A₂, not so widely distributed in nature, may be extracted from fresh-water fish. While the alcohol does not crystallize, the aldehyde occurs as orange crystals.

Vitamin A acetate is a finely divided, yellow, crystalline powder, nearly odourless and tasteless, insensitive to oxidation. It has never been shown to occur in nature but is made synthetically. Vitamin A palmitate is a yellow liquid, practically without odour or taste. Natural vitamin A exists as the palmitate ester.⁽¹⁾

Several factors are of central significance in the decision whether to use vitamin A derived from fish oils or synthetic vitamin A. These are potency (or the amount of biological activity possessed), stability and certainty of the biological activity, odour and taste. The importance of these factors may vary, depending upon whether the product is to be used for human consumption or animal feeds and, when it is for human use, whether the taste and odour of the vitamin A is concealed, as in a capsule, or open, as in margarine. Comparative prices do not seem to be a significant factor in the selection.

(1) Transcript, Vol. 75, p. 11381-2

Western Chemical Industries Limited submitted that vitamin A of a stipulated concentration or potency made from fish oils is not different from synthetic vitamin A:

"The essential difference lies in the concentration or potency. An all synthetic (derived from acetylene) material cut back, for example, to a potency of 400,000 I.U./gm would have no claim to be considered in a different category from fish liver oil of this potency."(1)

A spokesman for Tennant Smith Limited, however, noted:

"Potency actually is a factor in all uses of vitamin A, particularly in the multi-vitamin field...It is desirable to have the highest possible unit potency...In the margarine field, I would say that potency alone is not an especially important factor. Of more importance to the margarine field and to the liquid drop preparation field is the question of taste and related odour...You can wrap vitamin A in gelatine capsules; if you are fortunate enough not to burp, you don't ever taste it once you have swallowed the capsule. Tablets can be coated with a sugar and frequently are, for appearance as well as taste. So, in both of these dosage forms the taste is pretty much masked. Questions such as stability, potency and the certainty factor become more important in this instance."(2)

It was pointed out that there is no adequate criterion with respect to taste and odour. When margarine was first introduced, some taste and odour of fish oil was acceptable, but specifications have become more exacting as synthetic vitamin A, devoid of taste and odour, has become available. It was stated that any taste and odour present in forms of vitamin A derived from fish oil would result from the impurities present, or from processing, and not from the vitamin A itself. In any event, the manufacturers of margarine have preferred to use the synthetic vitamin A.

Method of Manufacture

Vitamin A can be isolated from fish liver oil. Cod-liver oil is a prominent source but the livers of such fish as halibut, rockfish, dogfish, soup-fin shark, tuna, mackerel, sword-fish and sea bass are "outstanding sources of vitamin A", containing 10 to 100 times as much as cod-liver oil.(3) Fresh livers from these fish are cooked and subjected to processes of saponification and molecular distillation which will yield, depending upon variations in procedure, vitamin A concentrate (an oily fluid with a very high concentration of the vitamin and only a bland odour) or vitamin A crystals said to be identical to synthetic vitamin A in every respect. The odour of fish oils is carried by the fatty acids, most of which are removed by molecular distillation.

(1) Transcript, Vol. 75. p. 11378

(2) Same, Vol. 77, p. 11769

(3) Encyclopaedia Britannica, Vol. 5, p. 915d

Synthetic vitamin A is made from citral, acetone, formaldehyde and acetylene. It is practically odourless and tasteless.

The vitamin A acetate and palmitate esters are made by combining the vitamin A alcohol with acetic acid or palmitic acid, respectively. The alcohol may be either synthetic or processed from fish liver oil, but the pure chemical products are identical. The esters made from fish-liver derived vitamin A alcohol were called, by one spokesman at the public hearing, synthetic as, of course, were those made from the synthetic alcohol.(1)

When exposed to oxygen (as in air) vitamin A will oxidize and its potency will be destroyed. To avoid this, it may be packed in air-tight drums which might contain, as well, an inert gas. Or an anti-oxidant, such as butylated hydroxy toluene or butylated hydroxy anisole, may be added which will retard oxidation until the anti-oxidant is consumed, at which stage oxidation will commence. Although the pure vitamin A crystal will start to oxidize as soon as it is made, some is sold without anti-oxidants. However, these are added as a matter of routine unless the purchaser requests otherwise. Gelatin and sugar are sometimes added to vitamin A and, in so far as they exclude air from contact with the vitamin, they act as anti-oxidants, but are not added for this reason; their principal function is to assist in the manufacture of dry tablets. When diluted in oil, vitamin A does not exhibit a pronounced tendency to oxidize because the oil protects it. Vitamin A palmitate crystals are, similarly, susceptible to oxidation.

The degree of concentration necessary to distinguish between a fish oil and a vitamin A concentrate of fish-liver oils is not clearly defined. The Explanatory Notes to the Brussels Nomenclature state that the heading includes concentrates "to which an additional quantity of vitamin A or D has been added subsequently", without specifying how much the additional quantity is to be. It was suggested at the public hearing that a concentration of 3000 international units per gram should qualify the fish-liver product as a concentrate.(2) This is higher than fish-liver oils in their natural state but lower than pure vitamin A alcohol (1 gram contains 3.3 million I.U.). The concentration of vitamin A in fish oil in its natural state depends upon the type of fish and its habitation, but appears to be about 1,000 I.U.

The Industry

Synthetic vitamin A is not made in Canada. The market was said to be too small to support the required capital investment, and the Board was advised that world demand, at the time of the hearing in 1962, was adequately supplied by only nine plants, four of them in the United States.(3) However, concentrates of vitamin A in fish-liver oil were, in 1962, being made in Canada by the following companies:(4)

(1) Transcript, Vol. 75, p. 11424

(2) Same, Vol. 75 p. 11466

(3) Same, Vol. 76, p. 11620

(4) Same, Vol. 75, p. 11443

Canadian Fish Company, Vancouver, B.C.
 Fisherman's Cooperative, Prince Rupert, B.C.
 Western Chemical Industries Ltd., Vancouver, B.C.
 Whitmore's Laboratory, Halifax, N.S.

Western Chemical Industries also isolates vitamin A and produces the acetate and palmitate esters. This company said that it could, using domestic and imported raw fish oil, supply the Canadian market for vitamin A. Using only Canadian raw material, it could supply about half the market with essentially the equipment then in operation. This capacity, however, is not fully utilized because not all of the domestic purchasers of vitamin A are willing to use that derived from fish-liver oil.

Much of the Canadian product is exported, principally to China. By using imported Japanese fish oils, obtained at lower prices than Canadian oil, the Canadian processor is able to sell in China competitively with Japanese producers. Most of the vitamin A consumed in Canada is imported from the United States and the United Kingdom, for reasons noted later in this report.

The Market

Various estimates of the size of the domestic market were received by the Board, ranging from a low of 18 trillion (million million) international units, valued, in 1960, at \$1.5 million, to about 28 trillion.⁽¹⁾ The size of the market for the products in which they are used (particularly livestock feeds) is not accurately known, nor is the concentration of vitamin A in these products. The use of vitamin A, however, was said to have increased very much faster than the population of Canada. Present consumption, therefore, undoubtedly would be nearer or above the higher estimate.

Vitamin A is a nutritive element in three categories of use: pharmaceuticals (as in tablets and capsules), food for human use (margarine, consuming about 15 per cent of all vitamin used, bread and fruit drinks) and livestock and poultry feed (using about half of all vitamin A consumed).

If the Canadian market in 1960 was about \$1.5 million, imports which, in total, were valued at nearly one million dollars were supplying two thirds of the market, in terms of value, in that year. This would be sufficient to supply all food and pharmaceutical use and about 40 per cent also of the animal feed requirements. If the Canadian market was 28 trillion units, at the average value per unit indicated by the above estimate it would have a value of about \$2.3 million and imports would be supplying just over 40 per cent of the market.

The largest part of the market for vitamin A for animal and poultry feeds was said to be in Ontario. This was attributed partly to the higher natural content of vitamin A in the dried grasses of the prairies fed to livestock there; it also reflects the substantial poultry industry in that province. The use of poultry feeds in which the vitamin A is contained in fish oil was said to be advantageous in winter

(1) Transcript, Vol. 75, p. 11376; Vol. 76, p. 11585

feeding on the prairies because of the high calorific value of the oil.

Estimated Consumption of Vitamin A in Canada, 1960

<u>Use</u>	<u>Consumption</u>	
	<u>Trillion International Units</u>	<u>Per Cent of Total</u>
A) Pharmaceuticals	6	35
B) Food for human use		
a) Margarine	3	15
C) Feed for animal use (including poultry)	<u>9</u>	<u>50</u>
Total of above	18	100
(Alternative submitted estimate)	(28)	

Source: Transcript, Vol. 75, p. 11403-4; Vol. 76, p. 11585-9, 11609

Available data on imports are given in the following table; available data suggest that imports are principally from the U.S.A., though one company said that its requirements came from the United Kingdom.

Value of Imports of Vitamin A, Vitamin A Acetate
and Vitamin A "Palmitate", 1956-63

<u>Year</u>	<u>Vitamin A</u> \$'000	<u>Vitamin A Acetate</u> \$'000	<u>Vitamin A Palmitate</u> \$'000	<u>Total</u>
1956	95	85	215	395
1957	125	125	305	555
1958	205	140	350	695
1959	240	160	355	755
1960	360	120	505	985
1961	535	230	450	1,215
1962	520	475	500	1,495
1963	820	230	425	1,475

Source: Dept. of Industry, Chemical Import Trends, s.c. 8074, 8075, 8415

Taste and odour were said to inhibit the use of vitamin A made in Canada from fish-liver oils. Although this form was originally used in margarine, and the question of taste was admitted to be a matter of opinion, the Canadian margarine manufacturers maintained that they would use only synthetic vitamin A because it is tasteless and odourless. Fish oil is extensively used in margarine but this has been thoroughly processed to remove taste and odour. Similarly, vitamin A derived from fish is not used for some pharmaceutical products although it appeared to be regarded as suitable for use in capsule or coated form. The Canadian

producer estimated that about one half of the pharmaceutical use came from fish sources. Fish-liver vitamin A is most extensively used in preparing livestock feeds, although even in this use superiority was claimed for the synthetic material, largely because of the absence of such extraneous substances as cholesterol and the greater precision possible in measuring dosages. The calorific value of fish-liver oil concentrates of vitamin A, however, is considered to be especially valuable particularly in winter feeding of poultry.

The use of vitamin A as an additive to human food or animal feed apparently adds little to the cost of the final product. The Board was advised in the course of the hearing that poultry mash, selling to the farmer at about \$80 per ton, contain from 21 cents to 95 cents worth of vitamin A per ton; the cost of vitamin A in a pound of margarine, selling for about 30 cents, was set at about 1/5 cent,⁽¹⁾ though the total cost, for all margarine consumed, was appreciable. Margarine must, by law, contain sufficient vitamin A that a reasonable daily intake will provide a minimum of 1600 units and a maximum of 2500 units. Since a reasonable daily intake of margarine is held to be two ounces, a pound of margarine must contain a minimum of 12,800 units of vitamin A and a maximum of 20,000 units.

No Canadian prices are available, but they were said to be about 10 per cent lower than prices in the U.S.A. In the United States, the price of one million international units of vitamin A palmitate was 5 cents in March 1965, when purchased in lots of 100 billion units. The price of the acetate was about 7 cents a million units at the same time. At these prices, the vitamin A content of a pound of margarine would cost about 1/12 cent, based on 16,000 units of vitamin A per pound.

Prices of Vitamin A in the United States,
Selected Years, 1955-65

Year	Vitamin A Acetate Synthetic, Dry 500,000 A Units Per Gram \$/Kilogram(a)		Vitamin A Palmitate Liquid 1,000,000-1,800,000 A Units/Gram \$/1,000,000 Units	
	High	Low	High	Low
1955	72.50	72.50	.12	.10
1956	67.50	67.50	.10	.10
1960	65.00	65.00	.0950	.0950
1961	65.00	47.50	.0950	.07
1962 March	..	47.50	..	.07
1963 March	..	35.00	..	.05 ^(b)
1965 March	..	35.00	..	.05

(a) In Kilo lots, 1955 - 1961; in 100 Kilo lots 1962 - 1965, delivered

(b) In lots of 100 billion units, from 1963

Source: Based on Oil, Paint and Drug Reporter

(1) Transcript, Vol. 75, p. 11386

Tariff Considerations

When vitamin A acetate or palmitate is for use other than in the production of food products for human consumption, it is ruled made in Canada and is dutiable under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. When vitamin A is for use in the production of food for human consumption, it is of a purity and form deemed to be not made in Canada and may be entered under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. Vitamin A of a kind not produced in Canada, without admixture or mixed only with any necessary carrier or diluent, when for use in the manufacture of animal or poultry feeds may be entered free of duty under item 219h. If the vitamin A has additives for stabilizing it is dutiable under tariff item 220a(i) at rates of 15 p.c., B.P., 20 p.c., M.F.N. It is understood that much of the imported product would contain a stabilizer. Tariff item 830 permits duty-free imports of:

"Fish oils in their natural condition, or oils so treated as to increase their content of vitamins, or solutions of synthetic vitamins in animal or vegetable oils, when imported for use exclusively by Canadian manufacturers for fortifying the vitamin content of fish oils of Canadian production, provided the latter constitute at least ninety-five per cent by volume of the finished fortified oils."

Tariff items 219h and 830 are not within the terms of Reference 120.

Seven companies and three associations, as noted below, made representations before the Board on vitamin A; the only Canadian manufacturer is Western Chemical Industries Limited. In addition, the spokesman for the Canadian Feed Manufacturers National Association questioned the spokesman for Western Chemical Industries Limited on technical details concerning the use of vitamin A and the methods of measuring its potency. All but Western Chemical Industries were interested principally in synthetic vitamin A, for which they proposed duty-free entry or low rates of duty; little or no exception was taken to the proposal that vitamin A be classified in an item worded like B.T.N. heading 29.38. Western Chemical Industries Limited, the producer of vitamin A esters from fish-liver oils, proposed rates of 15 p.c., B.P., 20 p.c., M.F.N.

Companies:

- 1) Canada Packers Limited
- 2) Charles E. Frosst & Company
- 3) Lever Brothers Limited
- 4) Mead Johnson of Canada Limited
- 5) Monarch Fine Foods Limited
- 6) Tennant Smith Limited
- 7) Western Chemical Industries Limited

Associations:

- 1) Canadian Pharmaceutical Manufacturers Association
- 2) Institute of Edible Oil Foods
- 3) Canadian Feed Manufacturers National Association

Summary of Proposals for Rates of Duty
on Vitamin A

<u>Company or Association</u>	<u>Proposed Rates</u>	
	<u>B.P.</u>	<u>M.F.N.</u>
Canada Packers Limited (a) (b)	Free	Free
Charles E. Frosst & Company (b) (c)	Free	15 p.c.
Lever Brothers Limited (a) (c)	Free	Free
Mead Johnson of Canada Limited	Free	Free
Monarch Fine Foods Limited	Free	Free
Tennant Smith Limited	Free	Free
Western Chemical Industries Limited (d)	15 p.c.	20 p.c.
Canadian Feed Manufacturers National Association	Free	Free
Canadian Pharmaceutical Manufacturers Association	Free	15 p.c.
Institute of Edible Oil Foods(e)	Free	Free

- (a) "Until such time as synthetic vitamin A is manufactured in Canada to meet the requirements of the food industry"
 (b) For synthetic vitamin A palmitate until made in Canada
 (c) For manufacture of margarine
 (d) Changed from original proposal of 20 p.c., B.P. and 25 p.c., M.F.N.
 (e) For synthetic vitamin A acetate and vitamin A palmitate

Western Chemical Industries' proposal was reduced from its original level, "Following discussions with consumers subsequent to the announcement of our intention..."⁽¹⁾ The company spokesman said that he could not depend upon cheaper raw materials and improved technology to lower costs further in competition with synthetic vitamin A.

Lever Brothers recommended that, if the Board thought it desirable to provide a British preferential rate, it should be no more than 5 percentage points, in effect making the M.F.N. rate 5 p.c. The company noted that vitamin A is essential in the production of margarine, that domestic competition is keen and profit margins low in the margarine industry and that, therefore, any increase in the cost of raw materials must be passed on to consumers. Margarine itself is not subject to competition from imports because they are prohibited.⁽²⁾ Canada Packers and Monarch Fine Foods maintained that higher duties on vitamin A would increase their costs but would not induce them to use the fish-liver oil product because of its taste and odour. The Institute of Edible Oil Foods agreed that increased costs of vitamin A would increase the cost of margarine to consumers, and stated as well that, if the duties were removed, the manufacturers "would be enabled to pass on, in total, a considerable saving to consumers of margarine".⁽³⁾ The spokesman for Tennant Smith advocated separate tariff treatment for synthetic vitamin A as distinct from fish-liver oil vitamin A.⁽⁴⁾

- ⁽¹⁾ Transcript, Vol. 75, p. 11376
⁽²⁾ Same, Vol. 76, p. 11620
⁽³⁾ Same, Vol. 76, p. 11620
⁽⁴⁾ Same, Vol. 77, p. 11683

Odour and taste were the basis of Charles E. Frosst's recommendation because, the company said, they cause the fish-liver product to be unsuitable for pharmaceuticals.

Mead Johnson of Canada Limited, which manufactures in Canada a number of pharmaceutical and nutritional products, including multi-vitamin solutions incorporating vitamin A, said that it finds it necessary to use vitamin A in the synthetic form because of its superior quality, and added:

"Unless a Canadian firm can produce satisfactory forms of vitamin A, no amount of tariff protection will influence us to purchase...An increase in the rate of duty on synthetic vitamin A will increase the cost of our products, and must affect the cost at the consumer level. Under the circumstances we propose that the Board give consideration to removing the present rates of duty on all forms of vitamin A."(1)

The Canadian Pharmaceutical Manufacturers Association included vitamin A acetate and vitamin A palmitate as important chemicals and vitamin A alcohol as a less important chemical in a list, submitted to the Board, of chemicals used in the manufacture of pharmaceutical products, and recommended that some end-use treatment be adopted for these chemicals when for use in the manufacture of pharmaceutical products. The Association recommended that rates of Free, B.P. and 15 p.c., M.F.N. apply when the chemicals are not made in Canada and that the heading rates proposed by the Industry Committee (15 p.c., B.P. and 20 p.c., M.F.N.) apply when they are made in Canada.

More general submissions by the National Farmers Union and the Canadian Federation of Agriculture are noted in the section below dealing with other chemicals of the heading.

Summary

While a very large part of the discussion of vitamin A before the Board concerned the substitutability of vitamin A derived from fish-liver oils for the synthetized product, the commercial situation appeared to be that in most food and pharmaceutical uses the synthetized product is preferred.

Although vitamin A, as made in Canada, is somewhat cheaper than the imported product, many of the companies using vitamin A maintain that they will not use for human consumption that derived from fish-liver oil because of its offensive taste and odour. It is used in such minute quantities as a food supplement (the daily human requirement is 5000 international units) and its cost is a sufficiently small part of the total cost of most products into which it enters that relative prices of synthetic versus fish-liver vitamin A are scarcely relevant. The import duty payable is negligible under any of the rates suggested; it can have virtually no influence on the selection by food manufacturers of domestic or imported vitamin A, nor can it have an appreciable effect on raising or lowering prices to consumers.

(1) Transcript, Vol. 76, p. 11583

However, the use of fish-liver-derived vitamin A for livestock feeds is not so critical with respect to odour and taste, although manufacturers said that it is more difficult to formulate a feed with it than with the synthetic vitamin. A price differential might influence the selection of one type or the other.⁽¹⁾ For this reason, the tariff protection requested by the Canadian manufacturer might increase somewhat his sales to that market except to the extent that the protection continued to be diluted by duty-free entry under end-use items such as tariff item 219h. Livestock and poultry feeds use about 50 per cent of the vitamin A consumed in Canada.

With a price differential, the formulators of those pharmaceutical preparations where taste can be concealed might find some advantage in using the domestic product, though this factor would be unlikely to add appreciably to the sales of the Canadian producer.

The rates of duty requested by Western Chemical are those generally applying at present to vitamin A imported into Canada. Because they are not much of a burden on manufacturers of margarine and pharmaceuticals, both because of their slight impact and because of opportunities to pass them on to consumers, they have not, in the past, been effective in securing the Canadian market for the Canadian producer of vitamin A.

Other Chemicals of Heading 29.38

A submission on four chemicals was submitted by Charles E. Frosst and Company. These chemicals, which are made in Canada though not by Frosst, were said to be essential vitamins used as pharmaceutical chemicals. They currently may be imported under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N.; Charles E. Frosst and Company commented on these rates:

"We believe that these rates are sufficiently high to provide adequate protection for the Canadian producer. A higher tariff would not be in the best interests of the Canadian public."⁽²⁾

The company's interest in making this proposal was to prevent others from proposing a higher duty and the spokesman noted that he did not care to discuss actual rates because his company did not make the chemicals; he selected 15 p.c. and 20 p.c. because it "seems to be the general rate that is being asked for."⁽³⁾

Separate statistics for these vitamins are not generally available; in 1963, imports of vitamin C, in the form of ascorbic acid, isoascorbic acid and their salts, amounted to about one million dollars; imports of vitamins D₂ and D₃ together amounted to about \$80,000 and imports of vitamin B₁₂ to about \$200,000.

(1) Transcript, Vol. 76, p. 11610

(2) Same, Vol. 78, p. 11895

(3) Same, Vol. 78, p. 11899

The chemicals listed in Charles E. Frosst's brief are:

Ascorbic acid (Vitamin C)
 Pyridoxine hydrochloride (Vitamin B6)
 Vitamin D3
 Cyanocobalamin (Vitamin B12)

Kent Chemicals Limited of Vancouver also submitted a brief on Vitamin D3. The company said that it is the only Canadian manufacturer of this chemical, which is "an absolutely essential ingredient" in feeds for chickens and turkeys. The company estimated the Canadian market at 5 trillion units which would have a value of possibly \$68,000. In 1960, Kent Chemicals produced and sold nearly 3 trillion units.(1) Although the present rates of duty are 15 p.c., B.P. and 20 p.c., M.F.N., tariff item 830 was said to allow duty-free entry of the synthetic vitamin in fish or vegetable oil when the vitamin is to be used for increasing the vitamin D3 content of fish oils. It was also suggested at the hearing that vitamin D3 could be imported duty-free under tariff item 219h. The company's proposal was as follows:

"Because Canadian-manufactured vitamin D-3 is available at reasonable prices, we respectfully submit that all vitamin D-3, without exception, imported into Canada enter at duty rates of 15 per cent B.P. and 20 per cent M.F.N."(2)

A brief, in addition to the one by Charles E. Frosst noted above, was presented on cyanocobalamin by Smith, Kline and French Inter-American Corporation who recommended rates of Free, B.P. and 15 p.c., M.F.N. The same proposal was put forward by this company for thiamine hydrochloride, a derivative of vitamin B1.

Thiamine hydrochloride was one of six chemicals drawn to the Board's attention by Charles E. Frosst and Company. In distinction from the products noted earlier by this company, these chemicals are not made in Canada. Like the others, however, they are said to be essential vitamins. The company pointed out that, since these vitamins are not made in this country, the protection of the Canadian chemical industry is not involved and added:

"We believe that the cost of these essential vitamins should not be subject to an increase arising from unwarranted higher tariff rates."(3)

If the products should become made in Canada, the company would support rates of 15 p.c., B.P. and 20 p.c., M.F.N. under tariff item 711. Riboflavine, when imported for use in manufacturing feeds for livestock, poultry or fur-bearing animals, may be imported free of duty under tariff item 219f. Riboflavine, for more general use, and the other chemicals in the group, currently may be imported under item 208t at rates of Free, B.P. and 15 p.c., M.F.N., the rates proposed by the company. Any that are not made in Canada and for use in animal

(1) Transcript, Vol. 78, p. 11961-2

(2) Same, Vol. 78, p. 11911

(3) Same, Vol. 78, p. 11901

or poultry feeds may be imported duty-free under tariff item 219h. Neither item 219f nor item 219h is part of Reference 120. The chemicals to which this proposal applies are:

thiamine hydrochloride
thiamine mononitrate
calciferol
nicotinamide
riboflavine
riboflavine 5'-phosphate sodium

Some of these chemicals were included in a proposal by John Wyeth and Brother (Canada) Limited, covering the products listed below, none of which is made in Canada. In 1963, imports of riboflavine (vitamin B₂) amounted to about \$398,000; imports of thiamine hydrochloride and thiamine mononitrate together (Vitamin B₁) amounted to some \$130,000. They may be imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N., or, if for animal and poultry feeds, under tariff item 219h, as noted above. In recommending that there should be no increase in the rates until a substantial portion of Canadian requirements is available from Canadian production, the company said:

"an increase in duty rates would serve only to increase the costs and selling prices of those Canadian industries who must use these chemicals in their Canadian operations."(1)

The chemicals concerned are:

d pantothenol
riboflavin
thiamine hydrochloride
thiamine mononitrate
aqueous extract rice bran and yeast

Concerning the last-named product, the spokesman for the Industry Committee expressed doubt that it can properly be considered a chemical, and noted that, if it is a chemical, it should probably be under heading 38.19. He noted that he had been advised as follows by the company:

"We rechecked the various group headings into which Aqueous Extract Rice Bran and Yeast could fall and feel that Brussels Heading 29.38 is best applicable. The product is a natural source of the B complex series of vitamins and is a water extraction from the bran of rice and yeast."(2)

The National Farmers Union submitted a brief generally concerning antibiotics, vitamins, hormones and steroids, vaccines, ataractics and medicants as classified in Brussels heading 29.38, 29.39, 29.41, 29.42, 29.43 and 29.44. The brief said:

(1) Transcript, Vol. 78, p. 11908

(2) Same, Vol. 78, p. 11909

"At this time, the National Farmers Union wishes to state its opposition to any duties on these chemicals included under Brussels Headings 29.38, 29.39, 29.41, 29.42, 29.43, and 29.44 which are used in consumption or medicinally by people or which are used in agricultural production."(1)

The Union estimated that the Canadian feeds industry, in 1959, used some 3,075 tons of vitamins and of compounds containing vitamins, valued at over \$1.9 million. The spokesman for the Industry Committee commented that the Union's proposals are extreme and stated:

"We object to a basket proposal of unknown scope that is made without relation to whether the chemicals are or are not available from Canadian sources and unsupported by any evidence whatsoever as to why the proposal is significant."(2)

The Canadian Federation of Agriculture, in a letter to the Board, noted that it was broadly in agreement with the views of the National Farmers Union and said:

"It is the view of our organization that the duty-free entry of chemicals and antibiotics as end products for use or as materials for manufacture should be extended to all imports where they are for use in livestock feeds or used by farmers or veterinarians for veterinary, nutritional or pest control purposes..."

"Requests for increased protection should therefore be supported by evidence not only that such increases would benefit the industry, but that their refusal would raise real questions of social and economic equity, and the protection of the national interest."(3)

Labatt Industries Limited advised the Board that it was, at the time of the hearing, conducting research in the manufacture of a number of chemicals which would be classified in B.T.N. headings 29.38 and 29.40. Because of the limited size of the domestic market, the company expected to manufacture for export, although the products to be made were not disclosed. The argument in favour of a tariff was stated as follows:

"At this stage of our planning we have observed that foreign producers of the products that we plan to manufacture are accorded tariff protection in their domestic market and we believe that some tariff protection will be similarly desirable in this country to permit the further development of a viable Canadian industry. It is for this reason that we support the rates in Lists 1 and 3 as reported by the Industry Committee for the above headings."(4)

(1) Transcript, Vol. 78, p. 11914

(2) Same, Vol. 78, p. 11923

(3) Same, Vol. 78, p. 11925-6

(4) Same, Vol. 78, p. 11928

The rates referred to were generally 15 p.c., B.P., 20 p.c., M.F.N. for products made in Canada, and either free entry or Free, B.P., 15 p.c., M.F.N. for those not made in Canada.

The Canadian Pharmaceutical Manufacturers Association submitted to the Board a list of chemicals used by its members in the manufacture of pharmaceutical products and recommended that some end-use treatment be adopted for these chemicals when for use in the manufacture of pharmaceutical products. The Association recommended that rates of Free, B.P. and 15 p.c., M.F.N. should apply when the chemicals are not made in Canada and that the heading rates proposed by the Industry Committee (15 p.c., B.P. and 20 p.c., M.F.N.) apply when they are made in Canada. The list of chemicals in the present heading to which this proposal applies is as follows, the more important chemicals being marked by an asterisk.⁽¹⁾

Liquid or dry vitamin A -- (for use in pharmaceuticals or food products)
 Liquid or dry vitamin A & D₂ -- (for use in pharmaceuticals or food products)

Liquid vitamin A & D₂ & Beta carotene (for use in food products)
 Dry vitamin A -- (for use in animal feeds)

Aneurine hydrochloride
 Aneurine mononitrate
 Ascorbyl palmitate

Beta carotene*
 Beta carotene & vitamin A
 Beta carotene & D₂
 d-Biotin (vitamin H)*

Calciferol*
 Calcium ascorbate*
 Calcium D-pantothenate
 dl-Calcium pantothenate

Ergosterol

Folic acid (vitamin M)*

Niacin (nicotinic acid)*
 Niacinamide*

D-Pantothenic acid
 DL-Pantothenic acid
 D-Pantothenyl alcohol*
 d-Panthenol
 dl-Panthenol
 Phytomenadione

Riboflavin (vitamin B₂)*
 Riboflavin-5-phosphate sodium*

(1) Transcript, Vol. 77, p. 11827-8; Vol. 87, p. 13300

Thiamine hydrochloride (vitamin B₁)
 Thiamine mononitrate (vitamin B₁)*
 Tocopherol
 dl-Alpha tocopherol unesterified* (Vitamin E)
 Tocopheryl acetate
 dl-Alpha tocopherol acetate*
 Tocopheryl hydrogen succinate

Vitamin A acetate*
 Vitamin A alcohol
 Vitamin A palmitate*
 Vitamin D₃, crystalline
 Vitamin D₂*
 Dry vitamin E acetate*
 Vitamin K₁*
 Vitamin K₂

The following were listed by the Canadian Pharmaceutical Manufacturers Association as products, of prime interest to the members of the Association, which are made in Canada. Rates of 15 p.c., B.P. and 20 p.c., M.F.N. were proposed for them.

Ascorbic acid (vitamin C)*
 Calcium pantothenate*
 Cyanocobalamin (vitamin B₁₂)*
 Pyridoxine hydrochloride (vitamin B₆)*
 Sodium ascorbate*

Nicotinic acid, included in the above list, when imported for use in the manufacture of nicotinic acid amide and when imported for use in the manufacture of diethylamide of nicotinic acid, is free of duty under tariff item 2161.

HORMONES, NATURAL OR REPRODUCED BY SYNTHESIS,
AND DERIVATIVES THEREOF, USED PRIMARILY AS
HORMONES - B.T.N. 29.39

The Explanatory Notes to the Brussels Nomenclature describe hormones as follows:

"Hormones are active substances, extremely small amounts of which are capable of inhibiting or stimulating the functioning of particular organs. The secretion of these substances, usually by the endocrine glands, is governed by the sympathetic and parasympathetic systems. Hormones are carried by the blood, lymph or other liquids of the body of man or animals. They may also originate in the glands which are both endo- and exocrinal or in various cellular tissues. The present heading also includes such hormones reproduced by synthesis. Derivatives of natural or synthetically reproduced hormones having a similar hormonal activity are also included in the present heading provided that their primary use is as hormones."(1)

As indicated in the following tables, imports of hormones and of mixtures, blends or preparations of which hormones were the chief ingredients, amounted to over \$3.2 million in 1963 but, more generally, somewhat less than \$3 million in recent years.

Imports of Hormone Into Canada, 1958-64

<u>Year</u>	<u>Hormones: adreno- cortical including their salts and derivatives</u> \$'000	<u>Hormones: sex (includes synthetic preparations)</u> \$'000	<u>Total Hormones, their derivatives and preparations</u> \$'000
1958	1,860	200	2,060
1959	2,060	260	2,320
1960	1,660	200	1,860
1961	2,135	560	2,695
1962	2,300	600	2,900
1963	2,250	1,025	3,275
1964	1,160	1,577	2,737

Source: Department of Trade and Commerce, Department of Industry, Chemical Import Trends, 1958-63; D.B.S., Trade of Canada, Imports, 1964.

A more detailed breakdown of imports is available for the first six months of 1959 and the first six months of 1960, as follows:

(1) Explanatory Notes to the Brussels Nomenclature, 1955; 1964 Impression, p. 292

Imports Into Canada, January 1 to June 30, 1959 and 1960

	<u>1959</u> \$	<u>1960</u> \$
<u>Hormones</u>		
ACTH	26,317	24,413
Adrenal cortex extract	16,691	5,969
Anhydrohydroxy progesterone	2,444	-
Chorionic gonadotropin	8,760	20,076
Cortisone acetate and preparations	6,463	52,146
Desoxycorticosterone acetate	1,363	3,190
Dexamethasone, all forms	428,894	62,103
Dihydrotachysterol	3,309	-
Epinephrine racemic	21,919	26,913
Estradiol	1,084	1,026
Estrogenic compounds	1,341	2,178
Estrone	21,585	19,385
Ethinylestradiol	836	-
Ethisterone and ethinyl estradiol	6,822	6,869
9-Fluoroprednisolone	-	9,548
Fluorocortisone acetate	619	-
Fluoxymesterone	4,441	6,220
Hydrocortisone	14,997	6,425
Hydrocortisone with chloramphenicol	13,607	1,910
Hydrocortisone acetate	31,328	26,912
Hydrocortisone acetate with neomycin sulphate	74,540	64,149
Hydrocortisone alcohol	40,177	38,657
Hydrocortisone preparations	2,403	88,335
Hydrocortisone sodium succinate	63,751	77,160
Intermediate for manufacture of cortisone	79,436	11,759
Methyl androstanolone	3,422	33,048
6-Methyl-delta-1-hydrocortisone	26,804	-
Methyl prednisolone	-	122,382
Methyl testosterone	12,175	17,946
Norethandrolone	27,434	20,998
Norethindrone	27,499	16,445
Oxytocin	-	2,960
Pituitary gland extract	7,575	5,763
Polyestradiol phosphate	-	1,072
Prednisolone and preparations	116,676	14,049
Prednisolone with neomycin	26,411	-
Prednisolone acetate	15,688	2,788
Prednisolone phosphate	5,639	2,535
Prednisone	134,772	42,769
Prednisone preparations	-	5,981
Pogesterone	16,288	15,159
Sodium adreno chrome semicarbazone salicylate complex	2,270	3,363
Testosterone	4,430	17,096
Testosterone enanthate	3,433	4,428
Testosterone propionate	1,156	10,717
Triamcinolone	236,460	53,133
Tri-para-anisylchloroethylene	<u>20,307</u>	<u>-</u>
Total - hormones, and blends of which hormones are the chief ingredients	1,561,566	947,975

Source: Department of Trade and Commerce, Industrial Development Branch

A number of representations were made to the Board concerning individual hormones. Smith, Kline and French Inter-American Corporation proposed that rates of duty on sodium 1-3,5-3'-tri-iodothyronine, currently imported under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N., remain unchanged. This chemical is included in the Canadian Pharmaceutical Manufacturers Association lists later in this report.

John Wyeth & Brother (Canada) Ltd. submitted a proposal for hydrocortisone acetate; this chemical is included in a list submitted by the Canadian Pharmaceutical Manufacturers Association, as noted later in this report. It is not made in Canada and the company proposed that it should continue to be dutiable as at present under tariff item 208t, at rates of Free, B.P. and 15 p.c., M.F.N., until it is made in Canada; the company noted that an increase in duty would serve only to increase the costs and selling prices of those Canadian industries which must use this chemical in their Canadian operations.(1) Imports of hydrocortisone acetate were about \$31,000 and \$27,000 in the first half of 1959 and 1960, respectively.

Pfizer Canada named the following chemicals, not made in Canada, as products in which it is interested as an importer and as a user or reseller:

ethamicort
hydrocortisone
prednisolone

Imports of hydrocortisone amounted to about \$15,000 in the first half of 1959 and to about \$6,000 in the same period of 1960. Import data for prednisolone are combined with "prednisolone preparations", valued at \$116,676 in January to June of 1959, and \$14,049 in the same six months of 1960.

Pfizer Canada requested that the current tariff rates (Free, B.P. and 15 p.c., M.F.N. under item 208t) be continued for these three chemicals until they are made in Canada, after which rates of 15 p.c., B.P. and 20 p.c., M.F.N. should apply. The company observed that no useful purpose would be served by imposing duties on chemicals of a class not made in Canada. These chemicals were included in a proposal made by the Canadian Pharmaceutical Manufacturers Association summarized below.

Charles E. Frosst and Company described prednisone as a hormone imported into Canada for the relief of hay fever, rheumatoid arthritis and intractable asthma. Since prednisone was not made in Canada at the time of the hearing, and the protection of a Canadian industry was not involved, the company proposed that there be no increase from the existing rates of duty under item 208t, Free, B.P. and 15 p.c., M.F.N. However, if prednisone were to become made in Canada, the company would support rates of 15 p.c., B.P. and 20 p.c., M.F.N.(2) The proposal of the Canadian Pharmaceutical Manufacturers

(1) Transcript, Vol. 78, p. 11942

(2) Same, Vol 78, p. 11945

Association, summarized later in this report, includes prednisone as a more important chemical and agreed, essentially, with the Charles E. Frosst and Company proposal.

Charles E. Frosst and Company uses estrone, testosterone and b-estradiol in the manufacture of steroid derivatives. Imports were as follows:

	<u>Imports, January to June</u>	
	<u>1959</u>	<u>1960</u>
	\$	\$
Estrone	21,585	19,385
Testosterone	4,430	17,096
Estradiol	1,084	1,026

The company spokesman said that, as these products are not made in Canada and the protection of Canadian industry is not involved, the "cost of these therapeutically active pharmaceutical chemicals should not be subjected to an additional increase arising from higher tariff rates."⁽¹⁾ The company stated that it had imported these products under both tariff item 208t, at rates of Free, B.P. and 15 p.c., M.F.N., and item 863, chemicals for use in the manufacture of steroid derivatives, free of duty. While Charles E. Frosst did not propose any rates of duty, the company's submission was that "there is no sound economic justification for any increase in the existing duty rates."⁽²⁾

Charles E. Frosst and Company also noted an interest in a hormone, methyl testosterone, not made in Canada, and imported for use in pharmaceuticals.⁽³⁾ Imports for the first half of 1959 were valued at \$12,175 and, for the same period of 1960, \$17,946. It is dutiable under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. The company spokesman said there was no sound economic justification for any increase in the existing rates, but added that, if methyl testosterone should become made in Canada, the firm would support rates of 15 p.c., B.P. and 20 p.c., M.F.N. Methyl testosterone also appears in the list of more important chemicals of the Canadian Pharmaceutical Manufacturers Association later in this report.

Charles E. Frosst and Company, as noted above, imports estrone, testosterone and b-estradiol for the manufacture of steroid derivatives, and requested that tariff item 863 be continued so that it could import these chemicals free of duty. The spokesman for the Industry Committee noted the agreement with the objective of the Frosst proposal, which is to "provide them access to those materials which they consider to be important to them and which are not now made in Canada, at rates of duty which are the same as those rates now applicable under item 863."⁽⁴⁾ However, he suggested that the chemicals in which companies have an interest should be named individually and be dealt with at concessionary rates only so long as they are not made in Canada,

(1) Transcript, Vol 78, p. 11946

(2) Same, Vol 78, p. 11946

(3) Same, Vol. 78, p. 11949

(4) Same, Vol. 78, p. 11956

rather than by the extension of a general provision such as that of item 863, which does not have a "not-made in Canada" criterion.

Kent Chemicals Limited, like Charles E. Frosst, said:

"We strongly urge that end-use tariff item no. 863 either be extended for a longer period or, preferably, be made a permanent tariff item."(1)

The company imports chemicals, under this item, for use in making vitamin D-3 for use in poultry and cattle feeds. The brief said further:

"If Tariff Item 863 were not in effect it would mean that a Canadian manufacturer of Vitamin D-3 is being penalized by having to pay duties on imported raw materials not made in Canada, whereas the foreign manufacturer would not have to pay such duties since such raw materials were available in his own country."(2)

The company proposed that, rather than the extension of item 863 or the creation of permanent status for it, a new item be established which allowed chemicals used in the manufacture of vitamin D-3 to enter duty-free into Canada.

The spokesman for the Industry Committee suggested that Kent Chemicals might use tariff item 219h to import chemicals of a kind not made in Canada for use in the manufacture of vitamin D-3 for animal and poultry feeds.

Shawinigan Chemicals Limited, as a manufacturer of acetone used in making steroids, proposed that tariff item 863 be eliminated, and said:

"If...it should appear essential to continue some preferential treatment on raw materials for steroid manufacture, it is our proposal that such treatment be restricted to materials of a class not made in Canada, and that they be added en nomine to list 3 under the appropriate Brussels heading rather than to perpetuate Item 863 in its present form."(3)

The Industry Committee recorded proposals concerning three chemicals of this heading which were not otherwise brought to the Board's attention. Triamcinolone (9 alpha-fluoro-16-alpha-hydroxy-prednisolone) is the name of a chemical on which the Industry Committee said it had received a statement of interest under heading 29.45⁽⁴⁾ It is properly classified under heading 29.39. No proposal was received by the Board regarding its tariff treatment; it is dutiable at 15 p.c.,

(1) Transcript, Vol 78, p. 11960

(2) Same, Vol. 78, p. 11962

(3) Same, Vol. 78, p. 11967

(4) Same, Vol. 79, p. 12134

B.P., 20 p.c., M.F.N., under tariff item 711.

The Industry Committee made a separate statement on epinephrine (trade name, Adrenalin), and insulin without zinc, globulin or protamine.⁽¹⁾ These are both non-steroid types of hormone, obtained from adrenal of horses and from the pancreas glands of other animals. Both are used in medicine. Half-yearly imports of epinephrine were about \$22,000 in 1959 and \$27,000 in 1960. Imports of these two hormones are currently free of duty under tariff item 206a(1), not in Reference 120 - Chemicals. The Committee proposed that epinephrine and insulin without zinc, globulin or protamine, should be extracted from tariff item 206a(1) and relocated under an item like B.T.N. heading 29.39, to be entered free of duty.

The National Farmers Union submitted that all goods included in Brussels heading 29.39 which are "used by humans either in consumption or medicinally, or used in farming operations, be maintained exempt from import duties."⁽²⁾

Similarly, the Canadian Federation of Agriculture proposed the following:

"Duty-free entry of chemicals and antibiotics as end-products for use or as materials for manufacture should be extended to all imports where they are for use in livestock feeds or used by farmers or veterinarians for veterinary, nutritional or pest control purposes.

"Requests for increased protection should therefore be supported by evidence not only that such increases would benefit the industry, but that their refusal would raise real questions of social and economic equity, and the protection of the national interest."⁽³⁾

Labatt Industries Limited made a general submission pertaining to Brussels headings 29.38, 29.39 and 29.40. The only chemicals named were sodium propionate and calcium propionate, both of Brussels heading 29.14, but the company said that it was conducting research into the products of three headings, including 29.39.⁽⁴⁾ It was in general agreement with the proposals of the Industry Committee and said that some tariff protection is desirable in this country to permit the development of a viable Canadian industry.

The Canadian Pharmaceutical Manufacturers Association submitted to the Board lists of chemicals used by its members in the manufacture of pharmaceutical products, and recommended that some end-use treatment be adopted for these chemicals when for use in the manufacture of pharmaceuticals. The Association also named two chemicals,

(1) Transcript, Vol 78, p. 11934

(2) Same, Vol. 78, p. 11917

(3) Same, Vol. 78, p. 11925-6

(4) Same, Vol. 78, p. 11929

sodium estrone sulphate and testosterone enanthate benzilic acid hydrozone, which are made in Canada by one of its members.⁽¹⁾ Since these are not ruled made in Canada for Customs purposes, they are dutiable under tariff item 208t at Free, B.P., 15 p.c., M.F.N. The general recommendation was that the rates of Free, B.P. and 15 p.c., M.F.N. should apply to chemicals of this heading when they are not made in Canada and not otherwise provided for, and that heading rates proposed by the Industry Committee (15 p.c., B.P. and 20 p.c., M.F.N.) apply when the products are made in Canada. In the following lists of not-made-in-Canada chemicals, an asterisk denotes those considered to be more important chemicals by the Association.

- | | |
|--|--|
| Betamethasone (9 alpha-fluoro,
16-beta-methyl prednisolone) | Deoxycorticosterone acetate |
| Estradiol-3,17-dienanthate | * Desoxycorticosterone acetate |
| *Estrone (oestrone) | Dexamethasone |
| Ethamicort N.S. bulk | * Dimethisterone |
| | Dexamethasone 21-(Disodium
phosphate) |
| *Hydrocortisone acetate bulk | * Ethinyl Estradiol |
| Hydrocortisone alc. bulk | Ethisterone |
| L-triiodothyronine (sodium salt) | 17 alpha-Ethinylloestradiol |
| 3,5,3 prime | Fludrocortisone |
| Piperazine estrone sulphate | Fludrocortisone 21-acetate |
| *Prednisolone | * Fluoxymesterone |
| Prednisolone 11-beta, 16-alpha,
21-trihydroxy, 1,4-pregnadiene-
3,20-dione | 17-beta-Hydroxy-17-alpha-
methylandrost-4-n-3-one |
| *Prednisone | Liothyronine sodium |
| Prednisone 17-alpha, 21-hydroxy-1,
4-pregnadiene-3,11,20-trione | Oestradiol-17 beta |
| Sodium estrone sulphate | Oestradiol-17 beta 3-benzoate |
| *Testosterone | Oestradiol-17 beta dipropionate |
| *Testosterone enanthate | Prednisolone 21-acetate |
| *Methyl testosterone | Prednisolone 21-(disodium phosphate) |
| Testosterone enanthate benzilic
acid hydrazone | Prednisolone 21-(m-sodium-
sulphobenzoate) |
| Cortisol | * Progesterone |
| *Cortisone -- hydro | * Testosterone propionate |
| | Triamcinolone |
| | * Triamcinolone acetonide
micropulverized sterile |

The Industry Committee expressed the view that all products which currently had commercial importance were dealt with in the submissions which the Board had received for this hearing. The Committee recommended that other products should be accorded tariff treatment of 15 p.c., B.P. and 20 p.c., M.F.N. under a general heading provision.⁽²⁾

(1) Transcript, Vol. 77, p. 11829

(2) Same, Vol. 78, p. 11935-6

ENZYMES - B.T.N. 29.40

This heading applies, with certain exceptions, to enzymes both as single substances and as mixtures, whether or not chemically defined. It excludes, for example, papain as a dried latex and papaw juice (B.T.N. 13.03), enzyme preparations for use in the tanning industry (B.T.N. 32.03) and papain to which has been added dextrose or other substances (B.T.N. 38.19).

Enzymes are chemical substances necessary for carrying out the chemical reactions of biological processes. Although not true catalysts, they nevertheless perform a catalytic function. As enzymes occur in all living cells and may vary with the species, thousands of different enzymes exist. They are derived from natural sources such as plants, animals and micro-organisms. There are no synthetic enzymes.

At the public hearing, pancreatin, trypsin, chymotrypsin, pepsin and catalase were discussed. Although data are incomplete, it is probable that the market in Canada for products classified by this heading is about one million dollars annually.

Pancreatin, obtained from the pancreatic glands of hogs or cattle, is a crude substance containing amylase, trypsin and lipase. It is a cream-coloured amorphous powder which acts on starch and proteins. Pancreatin is the source from which trypsin and chymotrypsin are isolated. "Pancreatin may be used by itself, but if intended for use in the tanning industry or possibly even in the brewing industry, it would have possibly a mixture of some other enzyme which may come from fungal sources."⁽¹⁾ It is also employed as an aid to digestion and in dry-cleaning.

Trypsin is a crystalline proteolytic enzyme derived generally from pancreatic juice and sold as a pharmaceutical. It is a yellow to grayish powder which acts on albuminoid material, producing amino acids. In addition to pancreatic sources, the enzyme is also found in the spleen, leucocytes, urine, beer yeast, molds and bacteria.

Chymotrypsin is closely allied to and interchangeable with trypsin. Found in the intestine, it catalyzes the hydrolysis of various proteins to produce polypeptides and amino acids.

When used as pharmaceuticals in the treatment of necrosis, stomach ulcers, gangrene and other similar ailments, trypsin and chymotrypsin are usually employed in ointments or in combination with other products.

Pepsin (Pepsinum) is a proteolytic enzyme which converts proteins into albumoses and peptones. It is white or yellowish-white powder derived from the glandular layer of hogs stomachs and used as a digestive ferment and as a substitute for rennet in cheese-making.

(1) Transcript, Vol. 78, p. 11984

Catalase is a highly purified and sometimes crystallized oxidizing enzyme of blood and tissues (or of fresh tobacco leaves) possessing the unique property of decomposing hydrogen peroxide. It can be used to decompose residual hydrogen peroxide in preserving, bleaching and oxidizing processes.

In addition to animal organs, chemicals such as acid ammonium sulphate are employed in producing the animal enzymes.

"The techniques are classical techniques, generally speaking, to extract the gland and by fractionation, and in various temperatures and acetates, you end up with the crystalline product. That is as far as, say, the purified enzymes are concerned. In the case of an enzyme product, such as Pancreatin or Pepsin, generally you take the gland and activate it and you dry it."(1)

There are some substitutes, of vegetable origin, which compete to a degree with these enzymes; two were mentioned at the hearing, barides and papaine.

There are two or three manufacturers of enzymes in Canada, all located in Toronto. Canada Packers Ltd. produces the five enzymes mentioned above while Fine Chemicals of Canada Ltd., the only other manufacturer making representation before the Board, manufactures pancreatin and crude trypsin.

Imports of enzymes into Canada from Denmark, the U.K. and the U.S.A., for the period 1956-1963, have been as follows:

<u>Imports of Enzymes, 1956-63</u>			
<u>Year</u>	<u>Papaine</u>	<u>Other</u>	<u>Total</u>
	<u>\$'000</u>	<u>\$'000</u>	<u>\$'000</u>
1956	65	245	310
1957	48	235	283
1958	43	290	333
1959	74	260	334
1960	72	300	372
1961	104	325	429
1962	123	395	518
1963	162	435	597

Source: Department of Trade and Commerce, Chemical Import Trends

Statistics of domestic shipments and exports are not publicly available.

Available price information relates only to pepsin and trypsin. Pepsin sells for \$3.30 to \$12 per pound, depending upon its concentration. The recent price of trypsin has been \$7 per gram.(2)

(1) Transcript, Vol. 78, p. 11983

(2) Canadian Chemical Processing

Tariff Considerations

Products of this heading, when for use in the manufacture of pharmaceuticals or medical preparations, are free of duty under tariff item 206d:

"Animal glands and animal glandular organs, and extracts thereof, wet or dry, (whether alcoholic or not), when imported by manufacturers of pharmaceutical or medicinal preparations for use exclusively in the manufacture of such preparations in their own factories."

If not for the above purposes, pancreatin and chymotrypsin would be dutiable under tariff item 711 at rates of 15 p.c., B.P., 20 p.c., M.F.N., as would pepsin and trypsin; catalase would be classified under tariff item 711, with rates of 15 p.c., B.P. and 20 p.c., M.F.N.

Item 206d is not in Reference 120.

Another enzyme, rennet, raw and prepared, may be imported free of duty under tariff item 11 and papaine may be imported at rates of Free, B.P. and 5 p.c., M.F.N. under item 153b. Neither of these items is in Reference 120.

Canada Packers Limited and Labatt Industries Limited recommended rates of 15 p.c., B.P. and 20 p.c., M.F.N. for all enzymes. At the time of the hearing, Labatt Industries Limited was engaged in preparatory work for the manufacture of certain chemicals under this heading.

Fine Chemicals of Canada Limited also proposed the continuation of rates of 15 p.c., B.P. and 20 p.c., M.F.N., for pancreatin and trypsin.

The Canadian Pharmaceutical Manufacturers Association submitted to the Board a list of chemicals used by its members in the manufacture of pharmaceutical products and recommended that some end-use treatment be adopted for these chemicals when so used. The Association recommended rates of Free, B.P. and 15 p.c., M.F.N., when the products are not made in Canada, and the heading rates proposed by the Industry Committee (15 p.c., B.P. and 20 p.c., M.F.N.) when the products are made in Canada. The chemicals in the present heading to which this proposal applies, the asterisk marking one listed as a more important chemical, are:(1)

Chymotrypsin*
 Diastase
 Hyaluronidase
 Pancreatin
 Papain
 Pepsin
 Rennin
 Trypsin
 Trypsin buccal

(1) Transcript, Vol. 87, p. 13283

The Industry Committee expressed the opinion that "all products for which tariffs are important, are dealt with in submissions which the Board will receive at this hearing. Although some other products had been listed, tariffs relating to them do not appear to be sufficiently important for any company to come forward at this time with recommendations. In these circumstances, the Committee recommends that such other products be accorded tariff treatment by the classification and rates of duty for Heading 29.40."⁽¹⁾ Heading rates of 15 p.c., B.P., 20 p.c., M.F.N. were proposed by the Committee.

⁽¹⁾ Transcript, Vol. 78, p. 11968-9

GLYCOSIDES, NATURAL OR REPRODUCED
BY SYNTHESIS, AND THEIR SALTS,
ETHERS, ESTERS AND OTHER DERIVATIVES - B.T.N. 29.41

Glycosides are a group of organic compounds, generally solid and colourless, many of which are used for therapeutical purposes. Forming the reserve substances in vegetable organisms, they can be resolved by the action of acids, bases or enzymes into sugar and other compounds. Only two of the many glycosides were discussed at the hearing.

Digitoxin ($C_{41}H_{64}O_{13}$) is a white odourless crystalline powder derived from digitalis leaves and used as a heart stimulant. It is not produced in Canada. Import data are not available.

Salicin ($C_{13}H_{18}O_7$) is a colourless white powder derived from several species of salix populus plants and used as a remedy against fever and in treating acute rheumatism. At the time of the hearing in 1962, the spokesman for MacFarlan Smith (Canada) Ltd. stated, "It is not a very important item and for the past six or seven years we have not imported any into Canada".⁽¹⁾

Both digitoxin and salicin are currently dutiable under tariff item 208t, at rates of Free, B.P. and 15 p.c., M.F.N.

The spokesman for John Wyeth & Brother (Canada) Ltd. supported the present rates on digitoxin stating, "We submit that there should be no increase until such time as a substantial portion of Canadian requirements is available from Canadian production".⁽²⁾

Although MacFarlan Smith (Canada) Ltd. had not imported any salicin in recent years, the firm nevertheless requested that there be no change in present rates of duty as, "We are now thinking seriously of resuming imports ...".⁽³⁾

The National Farmers Union Presented a brief, opposing "any duties on those chemicals included under Brussels Heading ... 29.41 which are used in consumption or medicinally by people or which are used in agricultural production."⁽⁴⁾ The Union wanted these chemicals to be exempt from import duties.

The Canadian Federation of Agriculture noted in a letter that it was in general agreement with the views of the National Farmers Union and said in particular:

"It is the view of our organization that duty-free entry of chemicals and antibiotics as end-products for use or as materials for manufacture should be extended to all imports where they are for use in livestock feeds or used by farmers

(1) Transcript, Vol. 78, p. 11997

(2) Same, Vol. 78, 11994-5

(3) Same, Vol. 78, 11997

(4) Same, Vol. 78, p. 11914

or veterinarians for veterinary, nutritional or pest control purposes ... Requests for increased protection should ... be supported by evidence not only that such increases would benefit the industry, but that their refusal would raise real questions of social and economic equity, and the protection of the national interest." (1)

The Canadian Pharmaceutical Manufacturers Association submitted to the Board a list of chemicals used by its members in the manufacture of pharmaceutical products and recommended that some end-use treatment be adopted for these chemicals when so used. The Association recommended rates of Free, B.P. and 15 p.c., M.F.N. when the products are not made in Canada and the heading rates proposed by the Industry Committee (15 p.c., B.P. and 20 p.c., M.F.N.) when the products are made in Canada. Aloin and rutin, noted in the list below have been ruled made in Canada and are dutiable at 15 p.c., B.P., 20 p.c., M.F.N. The chemicals in the present heading to which this proposal applies, the asterisk marking the more important chemicals, are:

Aloin
Digitalin
Digitonin
Digitoxin powder*
Digoxin*
Rutin

The Industry Committee expressed the opinion that all the products of this heading, for which tariffs are important, were dealt with in the submissions which the Board had received for the hearing and that, while some other products had been listed, tariffs relating to them did not appear to be sufficiently important for any company to make recommendations concerning them. The Committee recommended that products for which other representations were not made be accorded the rates of duty for the heading, namely 15 p.c., B.P. and 20 p.c., M.F.N. (2)

(1) Transcript, Vol. 78, p. 11925-6

(2) Same, Vol. 78, p. 11993

VEGETABLE ALKALOIDS, NATURAL OR REPRODUCED BY SYNTHESIS, AND
THEIR SALTS, ETHERS, ESTERS AND OTHER DERIVATIVES - B.T.N. 29.42

This heading provides for alkaloids and "any alkaloid derivative that has a molecular structure readily identified as being largely related to the structure of the natural alkaloid from which it is derived."⁽¹⁾ Alkaloid preparations (medicaments) and vegetable extracts are excluded from the heading.

Vegetable alkaloids, generally derived from phanerogams, are a group of nitrogenous organic bases having powerful toxic properties. Some alkaloids are liquid and volatile, containing only carbon, hydrogen and nitrogen, but most contain oxygen as well; they are usually colourless, crystalline solids.

Only about 24 of the more than 800 known alkaloids are currently used, primarily in medical applications; strychnine, however, is used as a vermin killer and nicotine as an insecticide.⁽²⁾

This heading includes a number of narcotics named in the Narcotic Control Act including, among many others, opium, codeine and morphine. By international agreement, Canada does not permit the manufacture of narcotics, and imports or exports are allowed only under licence issued by the Minister of National Health and Welfare. The products of this heading are deemed to be of a class or kind not made in Canada. The market for these products is therefore supplied by imports which, as the table on the following page shows, amounted to more than one million dollars annually over the years 1959-63.

It may be noted that the data in the table include opium which is not covered by this heading, although its derivatives are. Opium imports, in terms of volume, have been as follows in recent years:

	<u>Total Opium Imports</u> Commercial Ounces ^(a)
1960	2,836
1961	2,857
1962	3,560
1963	2,720
1964	2,400

(a) A commercial ounce is a quantity of opium mixed with a quantity of diluent to the total weight of one ounce; it contains less than an ounce of opium

Source: Dept. National Health and Welfare

(1) Transcript, Vol. 79, p. 12009

(2) Encyclopaedia Britannica, Vol. 1, p. 642

Imports of Alkaloids, 1959-64(a)(b)

<u>Year</u>	<u>Codeine & Salts of</u>		<u>Caffeine & Salts of</u>		<u>Opium & Derivatives n.o.p.</u>		<u>Salts of Quinine</u>		<u>Cocaine</u>	
	oz.	\$	lb.	\$	oz.	\$	oz.	\$	oz.	\$
1959	131,197	646,184	243,654	479,729	10,269	40,905	50,607	14,567	760	8,692
1960	148,927	733,082	129,946	217,538	9,556	37,984	62,810	16,915	1,175	13,838
1961	156,789	808,951	220,503	397,686	9,844	44,387	57,332	18,789	1,185	14,585
1962	152,502	836,568	208,206	374,715	8,990	44,414	65,252	27,522	911	11,984
1963	165,755	902,263	224,945	383,218	8,484	47,678	89,349	39,589	1,151	15,646
1964	..	..	..	365,739	..	..	..	..	..	..

215

(a) Commercial ounces

(b) Only the most important alkaloids are included in this table. Opium is not included in heading 29.42, although opium derivatives are

Source: D.B.S., Trade of Canada, Imports

Charles E. Frosst and Company submitted a brief on methyl-hyoscine nitrate, used in the manufacture of pharmaceutical chemicals. It is not made in Canada and the company noted that protection of a Canadian industry is not involved. The company said that, as with many of the fine pharmaceutical chemicals, the volume of consumption in Canada will not be sufficient in the foreseeable future to justify domestic production. Its proposal was that the rates of duty not be increased from those currently in effect under tariff item 208t, Free, B.P. and 15 p.c., M.F.N. If the chemical should become made in Canada, the company would support rates of 15 p.c., B.P. and 20 p.c., M.F.N.

The same company made a proposal with respect to caffeine. Not made in Canada, it is used in combination with other ingredients in the preparation of compounds for the treatment of headache, fever and so on. Noting that the protection of Canadian industry is not involved, the company proposed that the cost of caffeine should not be subjected to increases arising from higher rates of duty. Its proposal was for the continuation of the current rates, Free, B.P. and 15 p.c., M.F.N., under item 208t. Should the product become made in Canada, the company would support rates of 15 p.c., B.P. and 20 p.c., M.F.N.

Although caffeine citrate was at one time ruled made in Canada, it is no longer so ruled and is dutiable under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. No data or proposals concerning it were brought to the Board's attention.

John Wyeth and Brother (Canada) Limited made a proposal on the chemicals listed below, saying:

"There being no Canadian manufacture of these chemicals, an increase in duty rates would serve only to increase the costs and selling prices of those Canadian industries who must use these chemicals in their Canadian operations. We submit that there should be no increase until such time as a substantial portion of Canadian requirements is available from Canadian production."(1)

All of these chemicals are currently dutiable under item 208t at rates of Free, B.P. and 15 p.c., M.F.N. The chemicals are:

caffeine
codeine phosphate
ephedrine hydrochloride
ephedrine sulphate
scopolamine methyl bromide

Codeine and its salts were also brought to the Board's attention by Charles E. Frosst and Company, which uses these products in making pharmaceutical preparations. They are widely used but, as narcotics, by international agreement are not made in Canada. As noted below, the United Kingdom has been the principal source of supply; lesser amounts have come from West Germany and India. In recommending that the rates of duty remain at the current level under item 208t,

Free, B.P. and 15 p.c., M.F.N., the company noted especially that the existing margin between the B.P. and the M.F.N. rates should not be disturbed and said, "Codeine is considered to be of strategic importance and the U.K. is the nearest and most convenient source of supply."(1)

On narcotics generally and on codeine phosphate in particular, Mallinckrodt Chemical Works Limited submitted a brief proposing free entry under all Tariffs, in the following words:

"We propose that rates of 0-0-0 be accorded narcotics until such time as they are manufactured in Canada, when rates of 15-20-25% should apply."(2)

The company set the figure of annual imports of narcotics at one million dollars with codeine phosphate comprising the largest part. The reason for requesting duty-free imports was that the company wanted to import from its parent plant in the United States and did not "want to be handicapped by a 15% duty when we reach outside the British preferential areas for our supplies."(3)

At the hearing on pesticides, in November 1962, a group of seven manufacturers of pesticides made a proposal concerning a list of biologically active materials for use in the manufacture of pesticide formulations. The companies were:

A.H. Howard Chemical Co. Ltd.	Orangeville, Ontario
Allied Chemical Services Ltd.	Calgary, Alberta
Chipman Chemicals Ltd.	Hamilton, Ontario
Gallowhur Chemicals Canada Ltd.	Lachine, Quebec
Manchester Products Ltd.	Galt, Ontario
Niagara Brand Chemicals	Burlington, Ontario
Green Cross Division	
Sherwin Williams Co. of Canada Ltd.	Montreal, Quebec

The companies proposed that:

"The signatories to this brief share the view of the Chemical Industry Committee that, when a biologically active chemical, now on Appendix II, is made in Canada, it should become subject to the duty rates which have been recommended for the appropriate B.T.N. heading."(4)

The companies' Appendix II contained a list of 67 specific chemicals classified principally under 12 headings from B.T.N. 29.22 to 29.45. At the time of the hearing, the products were considered to be not made in Canada. For such products the companies proposed duty-free entry. The proposal was based on the belief that a duty on biologically active materials, not made in Canada, would increase the prices of pesticides to Canadian users without producing off-setting advantages for any segment of industry. Only strychnine, under B.T.N. heading 29.42, was listed by the formulators.

(1) Transcript, Vol. 79, p. 12029

(2) Same, Vol. 79, p. 12036

(3) Same, Vol. 79, p. 12037

(4) Same, Vol. 108, p. 16333

The National Farmers Union stated its opposition to any duties on those chemicals included under Brussels Heading 29.42 which are used in consumption or medicinally by people or which are used in agricultural production. The Union proposed that such chemicals be "main-tained exempt from import duties".(1)

The Canadian Federation of Agriculture noted that it was in general agreement with the National Farmers Union and said:

"It is the view of our organization that the duty-free entry of chemicals and antibiotics as end-products for use or as materials for manufacture should be extended to all imports where they are for use in livestock feeds or used by farmers or veterinarians for veterinary, nutritional or pest control purposes."(2)

The Canadian Pharmaceutical Manufacturers Association submitted to the Board a list of chemicals used by its members in the manufacture of pharmaceutical products and recommended that some end-use treatment be adopted for these chemicals when so used. The Association recommended that rates of Free, B.P. and 15 p.c., M.F.N. should apply when they are not made in Canada and that the heading rates proposed by the Industry Committee (15 p.c., B.P. and 20 p.c., M.F.N.) apply when the products are made in Canada.

The chemicals in the present heading to which this proposal applies, the more important ones marked by an asterisk are:

Aminophyllin*
 Apomorphine hydrochloride
 Atropine sulphate
 Berberine hydrochloride
 Brucine sulphate
 Caffeine*
 Caffeine anhydrous*
 Caffeine citrate
 Cinchonidine sulphate
 Cinchonine
 Cocaine
 Cocaine hydrochloride*
 Codeine phosphate*
 Colchicine
 Deserpidine
 Dihydrocodeine
 Dihydrocodeinone*
 Dimenhydrinate*
 Ephedrine
 pseudoEphedrine
 Ephedrine hydrochloride*
 Ephedrine sulphate
 Ergometrine maleate*
 Ergometrine tartrate

(1) Transcript, Vol. 78, p. 11917

(2) Same, Vol. 78, p. 11925

Ergotamine
 Ergotamine Tartrate*
 Ethylmorphine hydrochloride
 Homatropine
 Homatropine hydrobromide
 Homatropine hydrochloride
 Homatropine methobromide
 Homatropine sulphate
 Hydroquinine
 Hyoscine
 Hyoscine methobromide
 (-)Hyoscine methonitrate
 Hyoscyamine hydrobromide
 Lobeline sulphate*
 N-Methylamphetamine
 Methyl morphine phosphate
 Morphine hydrochloride
 Morphine sulphate*
 Narcotine
 Papaverine
 Papaverine hydrochloride
 Pholcodine
 Physostigmine
 Physostigmine hydrobromide
 Physostigmine hydrochloride
 Physostigmine salicylate
 Physostigmine sulphate
 Physostigmine sulphite
 Pilocarpine hydrochloride*
 isoPilocarpine hydrochloride
 Pilocarpine nitrate*
 isoPilocarpine nitrate
 Quinidine sulphate*
 Quinine hydrochloride
 Quinine sulphate*
 Reserpine
 Reserpine hydrochloride
 Sparteine sulphate
 Strychnine
 Strychnine arsenate
 Strychnine hydrochloride
 Strychnine nitrate
 Strychnine phosphate
 Strychnine sulphate*
 Theobromine
 Theophylline
 Tubocurarine chloride
 Yohimbine hydrochloride

Salts of quinine may be entered free of duty under tariff item 206; this item is not part of Reference 120.

The Industry Committee expressed the view that all products for which tariffs are important were dealt with in submissions which the Board had received. Although some other products had been listed in references made to the Committee, tariffs relating to them did not appear to be sufficiently important for any company to come forward

with recommendations. The Committee recommended that products for which no other proposals were made be accorded tariff treatment by the classification and rates of duty for heading 29.42. The rates of duty proposed were 15. p.c., B.P., 20 p.c., M.F.N.

SUGARS, CHEMICALLY PURE, OTHER THAN SUCROSE, GLUCOSE
AND LACTOSE; SUGAR ETHERS AND SUGAR ESTERS, AND THEIR
SALTS, OTHER THAN PRODUCTS OF HEADINGS NOS. 29.39,
29.41 AND 29.42 - B.T.N. 29.43

Sugars are organic chemicals composed of carbon, hydrogen and oxygen, the latter two elements usually being present in the same ratio as in water. Sugars are among the products described as carbohydrates.

Heading 29.43 does not apply to sugars that are not chemically pure and it does not apply to sucrose, glucose and lactose whether or not chemically pure. At the time of the hearing, the only two sugars which were brought to the attention of the Board, then classified in this heading, were glucose and lactose. However, these products, even when chemically pure, have since been transferred in the Brussels Nomenclature to heading 17.02 where sucrose, even when chemically pure, and other sugars not chemically pure, are classified. Since glucose is dutiable under tariff item 139 which is not within the terms of Reference 120, it is not considered here. Lactose is dutiable under tariff item 711 which is within the terms of the Reference in so far as it relates to chemicals and plastics. This restriction on the inclusion of tariff item 711 and the fact that lactose now is regarded in the B.T.N. as being outside the chemical section of the classification minimizes its relevance to Reference 120. The sugar ethers, sugar esters, and their salts were, at the time of the hearing, classified in other headings of the B.T.N., for example, headings 29.14, 29.19 and 29.35. Although some of these products may have been dealt with as part of more general submissions under the various headings, they are not believed to have great commercial importance in Canada and are not separately dealt with under this heading. Thus, no products of known commercial importance in Canada that are clearly within Reference 120 remain classified by B.T.N. heading 29.43. However, a summary is given below of the information available to the Board on lactose.

Lactose is a milk product derived from whey, a by-product of the manufacture of cheese. Refined lactose is used by the pharmaceutical industry in making tablets and in various other ways; it is also used in the manufacture of baby foods.

The only representation before the Board on lactose was made by Peebles Products Limited, of Cornwall, Ontario, one of the two Canadian manufacturers; the company estimated the Canadian market at about 2 million pounds in 1962. Imports, mostly from the U.K. and Holland, were estimated to supply some 25 per cent of the market. The spokesman for the company said that his plant had capacity to supply Canadian requirements for the foreseeable future. Imports are dutiable under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. and the company proposed that these rates continue to apply.

Lactose was included on a list of chemicals submitted to the Board by the Canadian Pharmaceutical Manufacturers Association in recommending that some end-use treatment be adopted for chemicals used in the manufacture of pharmaceutical products. The Association

recommended that rates of Free, B.P. and 15 p.c., M.F.N. apply when the chemicals are not made in Canada and that the heading rates proposed by the Industry Committee (15 p.c., B.P. and 20 p.c., M.F.N.) apply when they are made in Canada. For lactose, therefore, this proposal in effect supported that by Peebles Products.

The National Farmers' Union stated its opposition to any duties on those chemicals included under this heading which are used in human food or medicine or which are used in agricultural production.

The Canadian Federation of Agriculture noted that it is in general agreement with the views of the National Farmers' Union and said in particular:

"It is the view of our organization that the duty-free entry of chemicals and antibiotics as end-products for use or as materials for manufacture should be extended to all imports where they are for use in livestock feeds or used by farmers or veterinarians for veterinary, nutritional or pest control purposes." (1)

The Industry Committee expressed the view that all of the commercially important chemicals of this heading had been dealt with in the briefs which the Board had received and said:

"Although some other products had been listed, they do not appear to have sufficient importance for any company to come forward at this time with recommendations. In these circumstances the Committee recommends that such other products be accorded tariff treatment by the classification and rates of duty for heading 29.43." (2)

The heading rates proposed by the Committee were 15 p.c., B.P., 20 p.c. M.F.N.

(1) Transcript, Vol. 78, p. 11925

(2) Same, Vol. 79, p. 12052

ANTIBIOTICS - B.T.N. 29.44

Antibiotics are a group of organic chemicals obtained by secretion of micro-organisms and identifiable by their action on bacteria. In addition, they can be produced by synthesis. This heading applies also to the chemical derivatives of the secretions as obtained naturally or as produced by synthesis but it does not apply to antibiotic preparations having the form of medicaments.

Some of the recommendations made to the Board concerned tariff item 880p. This item, in force at the time of the hearing in May, 1962, was revoked on November 1, 1962, and replaced, in altered form, by item 875b. Tariff item 880p is not within the scope of Reference 120. Some of the companies represented at the hearing proposed that item 875a be modified to include intermediates, not made in Canada, to be used in making antibiotics. This item was not changed but the intermediates were included in item 875b under which they are free of duty.

The wording of these three items is:

- 875a Amyl acetate, calcium carbonate, casein hydrolysates, cholesterol, ergosterol, ether U.S.P., methanol anhydrous, methyl isobutyl carbonyl acetate, N-ethyl piperidine, N-hexanol procaine hydrochloride, penicillin precursors, beef extract, corn steep liquor, soluble vegetable protein, distillers' dried solubles, and soya bean meal; all of the foregoing for use in the manufacture of antibiotics, bacteriologicals, hormone products and biologicals.
- 875b Antibiotics, crude, and antibiotic intermediates, structurally based on 6 amino-penicillanic acid, not further processed than extracted from their primary fermentation liquors, in crystalline form, of a kind not produced in Canada, for use in the manufacture of antibiotics.
- 880p Antibiotics, crude, structurally based on naphthacene, not further processed than extracted from their primary fermentation liquors, in crystalline salt form when imported by manufacturers of antibiotics for use in the manufacture of such products in their own factories.

In 1963, imports of all recorded antibiotics amounted to about \$7.8 million, made up of penicillin and products (\$1.7 million), streptomycin and products (\$0.5 million) and antibiotics, n.o.p. \$5.6 million. Substantial exports of antibiotics also are recorded; in 1962, these were valued at \$1.2 million; exports appeared to be at about this same level in 1964. Exports are made to many countries.

Fine Chemicals of Canada Limited submitted a brief on chloramphenicol, chloramphenicol palmitate and chloramphenicol sodium succinate. Chloramphenicol is an antibiotic substance usually administered in capsule form; the palmitate ester is used as a liquid suspension while the sodium succinate is administered by injection. Chloramphenicol and its palmitate are ruled made in Canada and are dutiable under tariff item 711 at rates of 15 p.c., B.P., and 20 p.c.,

M.F.N.; chloramphenicol sodium succinate is not ruled made in Canada and is entered under item 208t at rates of Free, B.P. and 15 p.c., M.F.N. Fine Chemicals of Canada Limited, the manufacturer, proposed that "chloramphenicol and its salts and derivatives...be dutiable at 15-20-25%." (1) There was no opposition to this proposal.

Cyanamid of Canada Limited drew the attention of the Board to two broad range antibiotics, tetracycline and chlortetracycline. The chlortetracycline made by Cyanamid bears the trade-name aureomycin. At the time of the hearing, these pharmaceutical chemicals were made in Canada from imported crude materials but production of the crude by Cyanamid of Canada was expected to begin in 1962. In May 1962, at the time of the hearing, the antibiotics themselves were dutiable under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N.; since that time, however, they have been ruled made in Canada and are dutiable under item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. These were the rates recommended by the company. The spokesman for the company said:

"I would suggest that, because of the similar characteristics, all the tetracyclines be considered; that is, chlortetracycline, tetracycline itself, dimethyl chlortetracycline and oxytetracycline." (2)

All of these with the exception of oxytetracycline have since been ruled made in Canada and are dutiable under item 711.

Tetracycline base and tetracycline hydrochloride were also the subject of a brief by Charles E. Frosst and Company. They are forms of the product above, mentioned by Cyanamid of Canada, tetracycline. The hydrochloride form was said to be used in capsules or tablets and the tetracycline base, in liquid products. Charles E. Frosst and Company said that, at the time of the hearing, these chemicals were not ruled made in Canada and that there was no sound economic justification for any increase in the existing rates of duty, Free, B.P. and 15 p.c., M.F.N. under tariff item 208t. The company stated that, if these products were made in this country, it would support rates of 15 p.c., B.P. and 20 p.c., M.F.N. under item 711. As noted above, tetracycline is now covered by a made-in-Canada ruling and is dutiable under item 711; tetracycline hydrochloride is dutiable under tariff item 208t at Free, B.P., 15 p.c., M.F.N.

Charles E. Frosst and Company submitted a brief on potassium penicillin G which it imports and uses in making pharmaceuticals. Although this product is apparently made in Canada, there was some doubt about its availability to companies other than its manufacturer, Ayerst, McKenna and Harrison Limited. This company said that it makes potassium penicillin G, procaine penicillin G and dibenzylethylene diamine penicillin G from imported N-ethyl-piperidine, an intermediate resulting from the fermentation phase of penicillin manufacture which is not now carried on in Canada. Ayerst, McKenna and Harrison said that it supplies over 20% of the Canadian market requirements of the ordinary types of penicillin. Charles E. Frosst and Company said:

(1) Transcript, Vol. 79, p. 12076

(2) Same, Vol. 79, p. 12083

"As far as we know Potassium Penicillin G. Made-in-Canada is not available on the market at the present time. It has not been offered to us for several years.

'We respectfully submit that until Made-in-Canada Potassium Penicillin G becomes freely available, the import duty rates be 0 per cent B.P. and 15 per cent M.F.N.'"(1)

Ayerst, McKenna and Harrison Limited, on the other hand, requested that rates of 15 p.c., B.P. and 20 p.c., M.F.N. be maintained on the types of penicillin mentioned above. Penicillin is ruled made in Canada and is dutiable under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. If Ayerst, McKenna and Harrison supply 20 per cent of the market and imports are of the order of \$1.7 million as noted above, the Canadian market for penicillin and its products would appear to be of the order of \$2 million.

John Wyeth and Brother (Canada) Limited proposed, for the following group of penicillins, that "there should be no increase in duty rates until such time as a substantial portion of Canadian requirements is available from Canadian production".(2) An increase, the company said, would serve only to increase the costs and selling prices of those Canadian industries which must use these chemicals in their Canadian operations. These products are currently dutiable under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. They are:

procaine penicillin G
potassium penicillin G
dibenzylethylene diamine penicillin G
dibenzylethylene diamine penicillin V
phenoxymethyl penicillin
potassium phenoxymethyl penicillin

The recommendation of the Canadian Pharmaceutical Manufacturers Association with respect to penicillin is noted later in this report, along with its recommendation for other chemicals of this heading.

John Wyeth and Brother (Canada) Limited also submitted that the rates of duty currently applicable for the following chemicals should not be increased. They are used in making pharmaceutical products and are dutiable under tariff item 208t at rates of Free, B.P. and 15 p.c., M.F.N. Of them, the company said:

"There being no Canadian manufacture of these chemicals, an increase in duty rates would serve only to increase the costs and selling prices of those Canadian industries who must use these chemicals in their Canadian operations."(3)

The products are:

streptomycin sulphate
polymyxin B sulphate
dihydrostreptomycin sulphate

(1) Transcript, Vol. 79, p. 12102

(2) Same, Vol. 79, p. 12110

(3) Same, Vol. 79, p. 12111

These chemicals were included in a list submitted by the Canadian Pharmaceutical Manufacturers Association showing chemicals used by its members in the manufacture of pharmaceutical products. The Association recommended that some end-use treatment be adopted for chemicals so used and that rates of Free, B.P. and 15 p.c., M.F.N. apply when the chemicals are not made in Canada but that the heading rates proposed by the Industry Committee (15 p.c., B.P. and 20 p.c., M.F.N.) apply when they are made in Canada. The list of chemicals in the present heading to which this proposal applies is as follows, the more important products being marked by an asterisk:

Amphotericin B*
 Bacitracin A*
 Bacitracin A zinc
 Benzathine penicillin
 Benzylpenicillin salts
 Chloramphenicol*
 Chloramphenicol pelmitate
 Dihydrostreptomycin sulphate*
 Erythromycin
 Erythromycin ethyl succinate
 Gramicidin*
 Griseofulvin
 Kanamycin and salts
 Neomycin and salts
 Neomycin sulphate*
 Novobiocin and salts
 Oleandomycin*
 Oxytetracycline*
 Phenoxymethylpenicillin*
 Polymixin B sulphate*
 Potassium penicillin*
 Procaine penicillin*
 Sodium penicillin*
 Streptomycin*
 Tetracycline*
 Tetracycline hydrochloride*
 Thiostrepton*
 Tyrothricin*
 Viomycin*
 Xanthocillin

At the hearing on pesticides, in November 1962, a group of seven manufacturers of pesticides made a proposal concerning a list of biologically active materials for use in the manufacture of pesticide formulations. The companies were:

A.H. Howard Chemical Co. Ltd.	Orangeville, Ontario
Allied Chemical Services Ltd.	Calgary, Alberta
Chipman Chemicals Ltd.	Hamilton, Ontario
Gallowhur Chemicals Canada Ltd.	Lachine, Quebec
Manchester Products Ltd.	Galt, Ontario
Niagara Brand Chemicals	Burlington, Ontario
Green Cross Division	
Sherwin Williams Co. of	
Canada Ltd.	Montreal, Quebec

The companies proposed:

"The signatories of this brief share the view of the Chemical Industry Committee that, when a biologically active chemical, now on Appendix II, is made in Canada, it should become subject to the duty rates which have been recommended for the appropriate B.T.N. heading."(1)

The products named, at the time of the hearing, were considered to be not made in Canada. For such products, the companies proposed duty-free entry. The proposal was based on the belief that a duty on biologically active materials, not made in Canada, would increase the prices of pesticides to Canadian users without producing off-setting advantages for any segment of industry. The only products under the present heading noted by the pesticide formulators were streptomycin and its salts.

The National Farmers' Union submitted a brief noting its opposition to "any duties on those chemicals included under Brussels Headings...29.44 which are used in consumption or medicinally by people or which are used in agricultural production".(2) The Union proposed that these chemicals be maintained exempt from import duties.

The Canadian Federation of Agriculture, in a comment on the chemicals of heading 29.44 said:

"It is the view of our organization that the duty-free entry of chemicals and antibiotics as end-products for use or as materials for manufacture should be extended to all imports where they are for use in livestock feeds or used by farmers or veterinarians for veterinary, nutritional or pest control purposes."(3)

Pfizer Canada noted an interest in the chemicals listed below as an importer and a reseller or user saying that, to the best of the company's knowledge, none is made in Canada. The company took the position that: "no useful purpose would be served by imposing duties on chemicals of a 'class not made in Canada' which the company uses in its operations or which it imports for resale. The restriction of such activities would not only deprive the company of profits which it now earns but such restrictions would also delay the development of markets in Canada to levels which would justify manufacture in Canada."(4) Pfizer recommended that these chemicals be dutiable at rates of Free, B.P. and 15 p.c., M.F.N. until they are made in Canada, when they should be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N. The products, some of which have been named above, are:

(1) Transcript, Vol. 108, p. 16332-3

(2) Same, Vol. 78, p. 11914

(3) Same, Vol. 78, p. 11925

(4) Same, Vol. 78, p. 11943

bacitracin
 dihydrostreptomycin
 neomycin
 oleandomycin
 oxytetracycline
 polymyxin
 streptomycin
 tetracycline
 viomycin

Fine Chemicals of Canada Limited submitted a brief dealing with end-use items 875a and 880p, noting the restrictions present in each of these items and recommending that the two items be combined and the wording and sense enlarged so that there would be no such restriction. The wording of items 875a, 875b and 880p has been reproduced at the beginning of the report on this heading. In November 1962, item 880p was deleted from the Customs Tariff and a new item, 875b, introduced which accommodates the recommendations of the company. Tariff item 880p is not part of Reference 120.

Charles E. Frosst and Company recommended that end-use item 875a be continued and that potassium penicillin G be dutiable under this item; alternatively to naming potassium penicillin G in the item, the company proposed that penicillin intermediate or crude penicillin, used for making benzathene penicillin, be included within the scope of the item. While the words "penicillin precursors" appear in item 875a, the company's difficulty stemmed from uncertainty regarding admission, by the wording of the item, of the products which it imported for making benzathene penicillin G. Tariff item 875b, incorporated in the Customs Tariff since the hearing, includes antibiotics, crude, and antibiotic intermediates, structurally based on 6 amino-penicillanic acid. The item provides duty-free entry for both the B.P. and M.F.N. Tariffs, as recommended by Charles E. Frosst and Company.

In summary, the Industry Committee noted:

"For heading 29.44, the Committee believes that all products for which tariffs are important are dealt with in submissions which the Board will receive at this hearing. Although some other products had been listed, tariffs relating to them do not appear to be sufficiently important for any company to come forward at this time with recommendations. In these circumstances, the Committee recommends that such other product be accorded tariff treatment by the classification and rates of duty for heading 29.44."(1)

OTHER ORGANIC COMPOUNDS - B.T.N. 29.45

This heading covers separate chemically defined organic compounds not classified elsewhere.

Fine Chemicals of Canada Limited included aluminum isopropoxide in a list of chemicals which, it said, are not made in Canada but which it imports for use in making chloramphenicol, an important antibiotic. Although the company noted that it is imported under tariff item 875a, this chemical is not named in the tariff item, which specifies certain products used in making antibiotics, bacteriologicals, hormone products and biologicals. More generally, aluminum isopropoxide is dutiable under tariff item 208t at Free, B.P., 15 p.c., M.F.N. In connection with this product, as well as others in heading 29.44, the company proposed the combining of tariff items 875a and 880p, the wording and sense to be enlarged to eliminate the restrictions then considered to be in those items.⁽¹⁾ Since the hearing, item 880p has been deleted from the Schedule and item 875b has been added; these changes appear generally to accommodate the proposals of the company, including, apparently, the duty-free provision for aluminum isopropoxide. Tariff item 880p is not in Reference 120.

The Canadian Pharmaceutical Manufacturers Association included quassin in a list of chemicals used by its members in the manufacture of pharmaceutical products and recommended that some end-use treatment be adopted for these chemicals when so used. The Association recommended that rates of Free, B.P. and 15 p.c., M.F.N. apply when the products are not made in Canada but that the heading rates proposed by the Industry Committee (15 p.c., B.P. and 20 p.c., M.F.N.) apply when they are made in Canada.

At the hearing on pesticides, in November 1962, a group of seven manufacturers of pesticides made a proposal concerning a list of biologically active materials for use in the manufacture of pesticide formulations. The companies were:

A.H. Howard Chemical Co. Ltd.	Orangeville, Ontario
Allied Chemical Services Ltd.	Calgary, Alberta
Chipman Chemicals Ltd.	Hamilton, Ontario
Gallowhur Chemicals Canada Ltd.	Lachine, Quebec
Manchester Products Ltd.	Galt, Ontario
Niagara Brand Chemicals	Burlington, Ontario
Green Cross Division	
Sherwin Williams Co. of Canada Ltd.	Montreal, Quebec

The companies proposed:

"The signatories of this brief share the view of the Chemical Industry Committee that, when a biologically active chemical, now on Appendix II, is made in Canada, it should become subject to the duty rates which have been recommended for the appropriate B.T.N. heading."⁽²⁾

(1) Transcript, Vol. 79, p. 12112

(2) Same, Vol. 108, p. 16333

The products named, at the time of the hearing, were considered to be not made in Canada. For such products, the companies proposed duty-free entry. The proposal was based on the belief that duty on biologically active materials, not made in Canada, would increase the prices of pesticides to Canadian users without producing offsetting advantages for any segment of industry. The only product listed under the present heading was Paris Green (Copper acetoarsenite).

The Industry Committee expressed the opinion that all chemicals under this heading which currently had commercial significance had been brought to the attention of the Board, and recommended that any other chemicals be accorded the rates of duty proposed for chemicals of the heading, 15 p.c., B.P. and 20 p.c., M.F.N.

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Table 1

Imports: Acid, acetic and pyroligneous, s.c. 8012^(a)

Tariff Items 213 and 214

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>gal.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/gal.	\$	\$	p.c. of
				(000)		Dutiable
						Value
<u>1. Total</u>						
1953	1	1	2.21	1	260	24.5
1954	1	1	1.20	1	437	33.6
1955	1	3	3.03	1	194	22.9
1956	7	37	5.49	1	288	25.1
1957	1	*	.69	*	91	23.6
1958	1	5	4.35	5	419	8.8
1959	1	4	3.37	3	303	9.1
1960	1	3	3.19	3	371	13.3
1961	14	10	.70	10	1,836	18.7
1962	4	6	1.27	5	830	15.2
1963	112	168	1.50	168	187,967	112.1
<u>2. United States</u>						
1953	1	1	2.21	1	260	24.5
1954	1	1	1.20	1	437	33.6
1955	1	1	1.43	1	194	22.9
1956	1	1	1.54	1	288	25.1
1957	1	*	.69	*	91	23.6
1958	1	5	4.35	5	419	8.8
1959	1	4	3.37	3	303	9.1
1960	1	3	3.19	3	371	13.3
1961	1	2	2.32	2	294	14.8
1962	2	5	2.19	5	693	14.5
1963	112	168	1.50	168	187,967	112.1

^(a) Beginning in 1964 included in s.c. 409-99 and 399-99

Table 2

Imports: Vinegar of any strength, s.c. 341^(a)

Tariff Items 213 and ex. 213

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>gal.</u>	<u>\$</u>	<u>\$/gal.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	54	21	.38	21	7,828	37.8
1954	61	25	.40	25	7,173	29.1
1955	53	21	.39	21	6,919	33.1
1956	35	21	.62	21	4,300	20.0
1957	49	29	.59	29	6,129	21.1
1958	181	81	.45	81	33,765	41.7
1959	423	132	.31	132	64,721	49.0
1960	86	49	.58	49	12,852	26.0
1961	216	89	.41	89	37,608	42.4
1962	167	92	.55	92	41,161	44.7
1963	117	75	.64	75	25,591	34.0
1964	85	74	.88	74	18,012	24.3
<u>2. United States</u>						
1953	49	13	.26	13	7,328	56.8
1954	53	16	.30	16	6,388	39.9
1955	47	14	.29	14	6,242	46.2
1956	30	14	.48	14	3,822	26.4
1957	41	19	.46	19	5,229	27.7
1958	173	70	.41	70	32,904	46.9
1959	414	122	.29	122	63,702	52.4
1960	67	30	.45	30	10,737	36.1
1961	201	72	.36	72	35,449	48.9
1962	152	78	.51	78	39,422	50.6
1963	98	57	.58	57	22,999	40.5
1964	67	50	.75	50	15,153	30.4

^(a) Beginning in 1964 renumbered as s.c. 117-49

Table 3

Imports: Acid, formic, s.c. 8025^(a)

Tariff Items 216 and ex. 216

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	822	93	.11	84	10,449	12.5
1954	496	56	.11	47	5,909	12.5
1955	930	95	.10	84	10,492	12.5
1956	1,083	113	.10	87	10,909	12.5
1957	1,760	176	.10	173	21,637	12.5
1958	1,265	128	.10	72	9,047	12.5
1959	1,157	114	.10	101	12,709	12.6
1960	1,141	120	.11	78	9,766	12.5
1961	1,521	141	.09	110	13,725	12.5
1962	1,945	183	.09	129	16,162	12.5
1963	2,009	194	.10	129	15,879	12.3
1964	1,772	176	.10	121	15,052	12.5
<u>2. United States</u>						
1953	232	30	.13	23	2,865	12.5
1954	67	12	.18	6	730	12.5
1955	97	14	.14	10	1,266	12.5
1956	31	4	.15	4	533	12.5
1957	33	5	.16	5	666	12.5
1958	57	10	.18	6	789	12.5
1959	29	5	.17	5	676	13.7
1960	39	7	.17	7	835	12.5
1961	45	7	.16	7	905	12.8
1962	12	3	.27	3	403	12.5
1963	35	8	.23	8	799	9.9
1964	15	6	.42	6	785	12.5

Table 3
(Cont'd)

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	lb.	\$	Value	Value	Collected	p.c. of
	(000)	(000)	\$/lb.	\$	\$	Dutiable
				(000)		Value
<u>3. Germany, Fed. Rep. of</u>						
1953	583	62	.11	60	7,490	12.5
1954	391	39	.10	39	4,908	12.5
1955	735	72	.10	65	8,131	12.5
1956	883	90	.10	73	9,072	12.5
1957	1,534	155	.10	152	19,021	12.5
1958	989	100	.10	48	6,018	12.5
1959	698	70	.10	59	7,409	12.5
1960	872	93	.11	51	6,425	12.5
1961	1,258	114	.09	85	10,690	12.5
1962	1,643	154	.09	101	12,588	12.5
1963	1,620	151	.09	92	11,462	12.5
1964	1,392	132	.10	83	10,374	12.5
<u>4. Netherlands</u>						
1953	7	1	.11	1	94	12.5
1954	38	5	.13	2	271	12.5
1955	98	9	.09	9	1,095	12.5
1956	169	19	.11	10	1,304	12.5
1957	193	16	.08	16	1,950	12.5
1958	220	18	.08	18	2,240	12.5
1959	429	39	.09	37	4,625	12.5
1960	230	21	.09	20	2,506	12.5
1961	218	20	.09	17	2,130	12.5
1962	289	25	.09	25	3,171	12.5
1963	331	33	.10	27	3,364	12.5
1964	343	35	.10	29	3,576	12.5

(a) Beginning in 1964 renumbered as s.c. 409-02

Table 4

Imports: Amyl acetate, s.c. 8391^(a)

Tariff Items 166, ex 166 and 875a

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	10	10	2,465	24.5
1954	21	13	3,183	24.5
1955	23	4	840	22.1
1956	13	3	801	23.7
1957	34	10	2,548	24.4
1958	35	14	3,518	24.7
1959	29	19	4,316	22.3
1960	5	4	948	22.7
1961	14	8	2,120	25.0
1962	6	6	1,506	24.3
1963	15	15	3,675	24.6
<u>2. United Kingdom</u>				
1953	*	*	32	9.9
1954	*	*	40	10.1
1955	1	1	75	10.0
1956	*	*	29	9.8
1957	*	*	42	10.1
1958	*	*	28	9.9
1959	*	*	43	10.0
1960	1	1	69	10.2
1961	*	*	7	10.3
1962	*	*	30	10.0
1963	*	*	39	10.0
<u>3. United States</u>				
1953	10	10	2,433	25.0
1954	21	13	3,143	25.0
1955	22	3	765	25.0
1956	12	3	772	25.0
1957	33	10	2,506	25.0
1958	35	14	3,490	25.0
1959	28	19	4,273	22.6
1960	4	3	879	25.1
1961	14	8	2,113	25.1
1962	6	6	1,476	25.0
1963	15	15	3,636	25.0

^(a) Beginning in 1964 included in s.c. 409-99

Table 5

Imports: Copper, sub-acetate of, or verdigris, dry, and precipitate
of, s.c. 8274^(a)

Tariff Items 208 and 851

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>
			<u>\$/lb.</u>
	<u>1. Total</u>		
1953	400	174	.44
1954	400	194	.49
1955	--	--	--
1956	1,000	604	.60
1957	100	64	.64
1958	--	--	--
	<u>2. United States</u>		
1953	400	174	.44
1954	400	194	.49
1955	--	--	--
1956	1,000	604	.60
1957	100	64	.64
1958	--	--	--

^(a) Beginning in 1959 included in s.c. 8415

Table 6

Imports: Lead, acetate of, not ground, s.c. 8292^(a)

Tariff Item 488

Year	Total Imports		Unit Value	Dutiable Value	Duty Collected	Duty as p.c. of Dutiable Value
	lb. (000)	\$ (000)	\$/lb.	\$ (000)	\$	
<u>1. Total</u>						
1953	120	19	.16	*	13	10.2
1954	89	14	.16	1	86	10.0
1955	160	27	.17	2	182	10.0
1956	180	32	.18	2	180	10.0
1957	121	20	.17	*	33	10.1
1958	111	17	.16	1	68	10.1
1959	119	18	.15	2	165	10.0
1960	86	13	.15	1	118	10.1
1961	121	19	.15	1	76	10.1
1962	96	16	.16	*	43	9.8
1963	82	14	.17	1	98	9.9
<u>2. United Kingdom</u>						
1953	119	19	.16	-	-	-
1954	86	13	.15	-	-	-
1955	153	25	.16	-	-	-
1956	172	30	.18	-	-	-
1957	119	20	.17	-	-	-
1958	105	17	.16	-	-	-
1959	110	16	.15	-	-	-
1960	79	12	.15	-	-	-
1961	118	18	.15	-	-	-
1962	94	94	.16	-	-	-
1963	77	13	.16	-	-	-
<u>3. United States</u>						
1953	1	*	.21	*	13	10.2
1954	3	1	.25	1	86	10.0
1955	2	1	.26	1	60	9.9
1956	4	1	.30	1	110	10.0
1957	2	*	.24	*	33	10.1
1958	1	*	.21	*	7	10.0
1959	4	1	.25	1	106	10.0
1960	2	1	.26	1	57	10.1
1961	3	1	.24	1	76	10.1
1962	2	1	.30	*	43	9.8
1963	4	1	.29	1	98	9.9

(a) Beginning in 1964 included in s.c. 409-99

Table 7

Imports: Oleic acid or red oil, s.c. 2291^(a)

Tariff Items 216 and 711

Year	Total Imports		Unit Value	Dutiable Value	Duty Collected	Duty as p.c. of Dutiable Value
	lb.	\$	\$/lb.	\$	\$	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	782	126	.16	116	22,866	19.6
1954	1,265	237	.19	235	39,691	16.9
1955	1,569	285	.18	264	45,983	17.4
1956	151	31	.21	29	5,292	18.3
1957	134	26	.20	20	3,886	19.8
1958	231	39	.17	26	5,061	19.3
1959	361	63	.18	31	5,417	17.5
1960	328	56	.17	30	4,883	16.5
1961	598	104	.17	25	4,189	16.4
1962	453	87	.19	17	2,906	17.3
1963	538	104	.19	3	545	17.5
1964	448	82	.18	34	6,478	18.9
<u>2. United Kingdom</u>						
1953	-	-	-	-	-	-
1954	66	10	.14	10	1,425	15.0
1955	81	14	.18	13	1,954	15.0
1956	10	2	.24	2	345	15.0
1957	-	-	-	-	-	-
1958	10	2	.16	2	253	15.0
1959	17	3	.15	3	381	15.1
1960	13	2	.14	2	266	14.9
1961	27	4	.14	4	585	15.2
1962	*	*	.38	-	-	-
1963	8	1	.14	1	169	15.0
1964	11	2	.19	2	325	15.0
<u>3. United States</u>						
1953	782	126	.16	116	22,866	19.6
1954	1,199	227	.19	225	38,266	17.0
1955	1,488	271	.18	250	44,029	17.6
1956	141	29	.20	27	4,947	18.5
1957	134	26	.20	20	3,886	19.8
1958	220	37	.17	25	4,808	19.6
1959	344	61	.18	28	5,035	17.7
1960	316	54	.17	28	4,617	16.6
1961	548	98	.18	19	3,254	16.9
1962	449	87	.19	16	2,798	17.2
1963	526	103	.20	1	297	20.4
1964	425	78	.18	31	5,908	19.4

(a) Prior to 1962 was s.c. 2288; beginning in 1964 renumbered as s.c. 409-52

Table 8

Imports: Stearic acid, s.c. 2292^(a)

Tariff Items 215, 215a and 216

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	1,206	145	.12	104	13,050	12.5
1954	1,061	155	.15	109	13,724	12.6
1955	1,506	220	.15	107	13,463	12.5
1956	849	134	.16	73	9,108	12.5
1957	906	137	.15	56	7,074	12.6
1958	2,126	285	.13	139	17,702	12.7
1959	1,338	172	.13	92	10,369	11.3
1960	1,518	192	.13	147	18,564	12.6
1961	656	87	.13	56	7,091	12.7
1962	1,080	135	.12	81	10,201	12.7
1963	1,456	159	.11	102	12,776	12.5
1964	1,787	261	.15	169	21,435	12.7
<u>2. United Kingdom</u>						
1953	209	23	.11	-	-	-
1954	235	29	.13	-	-	-
1955	738	96	.13	-	-	-
1956	293	42	.14	-	-	-
1957	388	59	.15	-	-	-
1958	154	25	.16	-	-	-
1959	53	8	.15	-	-	-
1960	36	5	.13	-	-	-
1961	16	2	.15	-	-	-
1962	16	2	.15	*	43	15.1
1963	25	4	.15	-	-	-
1964	3	1	.17	-	-	-

Table 8
(Cont'd)

Year	Total Imports		Unit Value	Dutiable Value	Duty Collected	Duty as p.c. of Dutiable Value
	lb.	\$	\$/lb.	\$	\$	
	(000)	(000)			(000)	

3. United States

1953	986	121	.12	104	13,050	12.5
1954	819	125	.15	109	13,724	12.6
1955	768	125	.16	107	13,463	12.5
1956	536	90	.17	73	9,108	12.5
1957	458	71	.16	56	7,074	12.6
1958	1,395	193	.14	139	17,702	12.7
1959	645	94	.15	92	10,369	11.3
1960	1,125	148	.13	147	18,564	12.6
1961	445	62	.14	56	7,091	12.7
1962	841	105	.12	80	10,158	12.7
1963	959	102	.11	102	12,776	12.5
1964	1,111	179	.16	169	21,435	12.7

4. Australia

1953	-	-	-	-	-	-
1954	-	-	-	-	-	-
1955	-	-	-	-	-	-
1956	-	-	-	-	-	-
1957	45	4	.10	-	-	-
1958	475	54	.11	-	-	-
1959	630	69	.11	-	-	-
1960	350	38	.11	-	-	-
1961	118	13	.11	-	-	-
1962	182	22	.12	-	-	-
1963	459	51	.11	-	-	-
1964	641	77	.12	-	-	-

(a) Prior to 1962 was s.c. 2289; beginning in 1964 renumbered as s.c. 409-42

Table 9

Imports: Monochloroacetic acid, s.c. 409-32^(a)

Tariff Items 711 and 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	<u>Dutiable</u>
				(000)		<u>Value</u>
			<u>1. Total</u>			
1964	3,982	509	.13	32	4,768	15.0
			<u>2. Germany, Fed. Rep. of</u>			
1964	2,447	320	.13	-	-	-
			<u>3. France</u>			
1964	1,454	180	.12	23	3,496	15.0

(a) Prior to 1964 included in s.c. 8022

Table 10

Imports: Soda, benzoate of, s.c. 8338^(a)

Tariff Items 208t and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	<u>Value</u>
				(000)		
<u>1. Total</u>						
1953	125	31	.25	31	5,074	16.1
1954	123	41	.34	41	6,296	15.2
1955	20	8	.40	8	1,207	15.5
1956	2	1	.31	1	140	19.9
1957	76	17	.23	17	3,452	20.0
1958	61	10	.16	10	1,934	20.0
1959	39	7	.17	7	1,338	20.0
1960	140	31	.22	24	4,805	19.8
1961	33	4	.12	4	754	19.7
1962	77	12	.15	11	2,483	22.0
1963	*	*	1.01	*	40	19.9

<u>2. United Kingdom</u>						
1953	102	23	.23	23	3,517	15.0
1954	116	38	.33	38	5,680	15.0
1955	13	4	.33	4	658	15.0
1956	-	-	-	-	-	-
1957	-	-	-	-	-	-
1958	-	-	-	-	-	-
1959	-	-	-	-	-	-
1960	22	7	.32	-	-	-
1961	-	-	-	-	-	-
1962	-	-	-	-	-	-
1963	-	-	-	-	-	-

Table 10
(Cont'd)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
<u>3. United States</u>						
1953	14	5	.40	5	1,043	19.3
1954	3	3	.84	3	461	17.0
1955	6	3	.55	3	549	16.3
1956	2	1	.31	1	140	19.9
1957	33	5	.14	5	940	20.0
1958	39	3	.08	3	615	20.0
1959	24	2	.09	2	454	20.0
1960	75	12	.16	12	2,433	19.7
1961	27	3	.09	3	504	19.6
1962	55	6	.11	6	1,299	21.5
1963	*	*	1.01	*	40	19.9
<u>4. Netherlands</u>						
1953	10	3	.26	3	514	20.0
1954	3	1	.25	1	155	20.0
1955	-	-	-	-	-	-
1956	-	-	-	-	-	-
1957	43	13	.29	13	2,512	20.0
1958	20	6	.30	6	1,210	20.0
1959	15	4	.29	4	884	20.0
1960	43	12	.28	12	2,372	20.0
1961	2	1	.24	1	106	20.0
1962	20	5	.26	5	1,184	22.5
1963	-	-	-	-	-	-

(a) Beginning in 1964 included in s.c. 409-99

Table 11

Imports: Benzoic acid, s.c. 409-75^(a)

Tariff Item 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value \$/lb.</u>
	<u>lb.</u> (000)	<u>\$</u> (000)	
	<u>1. Total</u>		
1964	23	8	.36
	<u>2. United Kingdom</u>		
1964	23	8	.36

(a) Prior to 1964 included in s.c. 8022

Table 12

Imports: Lauric acid, s.c. 409-50^(a)

Tariff Item 216

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
			<u>1. Total</u>			
1964	779	217	.28	60	9,061	15.2
			<u>2. United Kingdom</u>			
1964	247	74	.30	-	-	-
			<u>3. United States</u>			
1964	149	41	.27	27	4,422	15.4
			<u>4. Germany, Fed. Rep. of</u>			
1964	153	41	.27	8	1,252	15.0
			<u>5. Denmark</u>			
1964	105	24	.23	24	3,587	15.0
			<u>6. Netherlands</u>			
1964	124	38	.30	-	-	-

(a) Prior to 1964 included in s.c. 8022

Table 13

Imports: Tall oil, tall oil pitch and blended tall oil and
tall oil pitch, s.c. 1584(a)

Tariff Item 585a

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	lb.	\$	Value	Value	Collected	p.c. of
	(000)	(000)	\$/lb.	\$	\$	Dutiable
				(000)		Value
<u>1. Total</u>						
1953	4,376	174	.04	-	-	-
1954	3,907	165	.04	-	-	-
1955	6,443	326	.05	-	-	-
1956	8,264	498	.06	-	-	-
1957	8,091	437	.05	-	-	-
1958	8,315	439	.05	-	-	-
1959	9,162	468	.05	*	16	19.8
1960	13,060	566	.04	*	47	20.0
1961	11,373	714	.06	3	460	13.7
1962	12,283	985	.08	2	493	25.0
1963	16,781	1,179	.07	2	260	15.0
1964	12,359	746	.06	-	-	-
<u>2. United States</u>						
1953	4,376	174	.04	-	-	-
1954	3,907	165	.04	-	-	-
1955	6,442	326	.05	-	-	-
1956	8,264	498	.06	-	-	-
1957	8,091	437	.05	-	-	-
1958	8,315	439	.05	-	-	-
1959	9,162	468	.05	*	16	19.8
1960	13,060	566	.04	*	47	20.0
1961	11,272	711	.06	3	460	13.7
1962	12,238	982	.08	2	493	25.0
1963	16,159	1,137	.07	2	260	15.0
1964	12,193	739	.06	-	-	-

(a) Beginning in 1964 renumbered as s.c. 399-15, worded "Tall oil and tall oil pitch"; excludes tall oil fatty acid, s.c. 395-99

Table 14

Imports: Phthalic, anhydride, s.c. 8416^(a)

Tariff Item 923

Year	Total Imports		Unit Value	Dutiable Value	Duty Collected	Duty as p.c. of Dutiable Value
	lb.	\$	\$/lb.	\$	\$	
	(000)	(000)		(000)		
<u>1. Total</u>						
1956	5,153	897	.17	-	-	-
1957	7,227	1,104	.15	-	-	-
1958	6,664	985	.15	-	-	-
1959	7,248	972	.13	9	1,885	20.0
1960	7,660	1,428	.19	49	7,662	15.5
1961	12,609	2,240	.18	84	15,209	18.1
1962	7,254	767	.11	1	152	15.0
1963	9,257	883	.10	*	46	15.0
1964	15,582	1,703	.11	63	12,243	19.4
<u>2. United States</u>						
1956	801	163	.20	-	-	-
1957	422	86	.20	-	-	-
1958	171	35	.21	-	-	-
1959	156	28	.18	-	-	-
1960	3,075	574	.19	5	1,069	20.0
1961	1,105	203	.18	-	-	-
1962	227	39	.17	1	152	15.0
1963	3,767	384	.10	*	46	15.0
1964	6,293	749	.12	63	12,243	19.4
<u>3. France</u>						
1956	414	70	.17	-	-	-
1957	1,025	151	.15	-	-	-
1958	832	123	.15	-	-	-
1959	1,986	264	.13	-	-	-
1960	1,531	310	.20	-	-	-
1961	3,023	518	.17	20	4,029	20.0
1962	3,162	333	.11	-	-	-
1963	4,121	371	.09	-	-	-
1964	8,628	877	.10	-	-	-

Table 14
(Cont'd)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
<u>4. Belgium & Luxembourg</u>						
1956	254	44	.17	-	-	-
1957	721	111	.15	-	-	-
1958	132	21	.16	-	-	-
1959	177	22	.13	-	-	-
1960	132	36	.27	-	-	-
1961	1,324	259	.20	15	3,064	20.0
1962	1,951	197	.10	-	-	-
1963	535	49	.09	-	-	-
1964	-	-	-	-	-	-
<u>5. Italy</u>						
1956	2,721	462	.17	-	-	-
1957	3,242	478	.15	-	-	-
1958	5,144	749	.15	-	-	-
1959	4,759	635	.13	3	518	20.0
1960	694	133	.19	-	-	-
1961	1,846	378	.20	-	-	-
1962	882	92	.10	-	-	-
1963	66	6	.09	-	-	-
1964	661	77	.12	-	-	-
<u>6. Germany, Fed. Rep. of</u>						
1956	655	110	.17	-	-	-
1957	1,155	180	.16	-	-	-
1958	276	41	.15	-	-	-
1959	116	16	.14	7	1,367	20.0
1960	1,928	319	.17	-	-	-
1961	2,228	373	.17	8	1,623	20.0
1962	70	9	.13	-	-	-
1963	248	26	.11	-	-	-
1964	-	-	-	-	-	-

(a) Prior to 1956 included in s.c. 8410; Beginning in 1964 renumbered as s.c. 409-72

Table 15

Imports: Fumaric acid s.c. 8018^(a)

Tariff Items 216 and 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
<u>1. Total</u>						
1962	1,216	215	.18	22	3,309	15.0
1963	2,135	281	.13	8	1,246	15.0
1964	2,536	306	.12	17	2,498	14.9
<u>2. United Kingdom</u>						
1962	-	-	-	-	-	-
1963	475	71	.15	-	-	-
1964	669	98	.15	-	-	-
<u>3. United States</u>						
1962	726	157	.22	22	3,309	15.0
1963	343	64	.19	7	1,065	15.0
1964	102	19	.19	9	1,270	14.9
<u>4. France</u>						
1962	-	-	-	-	-	-
1963	278	33	.12	1	181	15.0
1964	727	81	.11	-	-	-
<u>5. Germany, Fed. Rep. of</u>						
1962	110	14	.12	-	-	-
1963	220	25	.11	-	-	-
1964	-	-	-	-	-	-
<u>6. Italy</u>						
1962	33	3	.10	-	-	-
1963	764	84	.11	-	-	-
1964	907	98	.11	-	-	-

(a) Prior to 1962 included in former s.c. 8022; beginning in 1964 renumbered as s.c. 409-65

Table 16

Imports: Acid, oxalic, s.c. 8017^(a)

Tariff Item 208q

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
<u>1. Total</u>						
1953	825	100	.12	98	7,321	7.5
1954	708	98	.14	86	6,477	7.5
1955	1,205	155	.13	153	11,477	7.5
1956	766	97	.13	96	7,274	7.5
1957	922	111	.12	111	8,320	7.5
1958	1,317	166	.13	165	12,377	7.5
1959	1,601	177	.11	131	9,814	7.5
1960	1,202	161	.13	161	12,065	7.5
1961	1,311	157	.12	157	12,127	7.7
1962	1,108	154	.14	154	11,571	7.5
1963	1,081	150	.14	150	11,371	7.6
1964	840	123	.15	123	9,256	7.5
<u>2. United States</u>						
1953	153	24	.15	23	1,721	7.5
1954	203	35	.17	34	2,565	7.5
1955	267	43	.16	43	3,212	7.5
1956	231	36	.16	36	2,734	7.5
1957	174	28	.16	28	2,107	7.5
1958	158	27	.17	27	2,051	7.5
1959	141	24	.17	22	1,633	7.6
1960	279	48	.17	48	3,572	7.5
1961	437	45	.10	45	3,384	7.5
1962	122	24	.20	24	1,797	7.5
1963	155	29	.19	29	2,165	7.5
1964	139	31	.22	31	2,348	7.6

Table 16
(Cont'd)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
<u>3. Germany, Fed. Rep. of</u>						
1953	516	58	.11	58	4,360	7.5
1954	279	30	.11	30	2,249	7.5
1955	469	52	.11	52	3,864	7.5
1956	308	35	.11	35	2,630	7.5
1957	491	55	.11	55	4,134	7.5
1958	514	63	.12	62	4,620	7.5
1959	521	62	.12	62	4,682	7.5
1960	266	33	.12	33	2,475	7.5
1961	53	7	.13	7	685	10.1
1962	17	2	.14	2	183	7.6
1963	37	5	.14	5	390	7.5
1964	24	4	.15	4	271	7.4
<u>4. Netherlands</u>						
1953	131	15	.12	15	1,154	7.5
1954	154	22	.14	22	1,647	7.5
1955	271	31	.11	31	2,297	7.5
1956	178	19	.11	19	1,444	7.5
1957	190	21	.11	21	1,578	7.5
1958	258	31	.12	31	2,317	7.5
1959	218	25	.12	25	1,908	7.5
1960	490	59	.12	59	4,415	7.5
1961	650	82	.13	82	6,167	7.5
1962	529	68	.13	68	5,129	7.5
1963	706	92	.13	92	7,161	7.8
1964	557	74	.13	74	5,570	7.5

(a) Beginning in 1964 renumbered as s.c. 409-62, "Oxalic acid"

Table 17

Imports: Maleic anhydride, s.c. 8418^(a)

Tariff Items 208t, 921 and 923

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	<u>Value</u>
				(000)		
			<u>1. Total</u>			
1962	206	35	.17	23	4,619	20.0
1963	-	-	-	-	-	-
			<u>2. United States</u>			
1962	96	20	.21	8	1,683	20.0
1963	-	-	-	-	-	-
			<u>3. France</u>			
1962	110	15	.13	15	2,936	20.0
1963	-	-	-	-	-	-

(a) Prior to 1962 included in s.c. 8410; beginning in 1964 included in s.c. 409-99

Table 18

Imports: Azelaic acid, s.c. 409-55^(a)

Tariff Item 216

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
			<u>1. Total</u>			
1964	541	214	.40	5	717	15.0
			<u>2. United States</u>			
1964	541	214	.40	5	717	15.0

(a) Prior to 1964 included in s.c. 8022

Table 19

Imports: Phthalates and phthalate esters n.e.s., s.c. 409-79^(a)

Tariff Items 208t, 711 and 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
			<u>1. Total</u>			
1964	25,330	6,626	.26	428	83,980	19.6
			<u>2. United Kingdom</u>			
1964	2,176	565	.26	5	791	14.9
			<u>3. United States</u>			
1964	22,980	6,026	.26	398	78,284	19.7

(a) Prior to 1964 included in s.c. 8415 and 8422

Table 20

Imports: Acid, lactic, s.c. 8009^(a)

Tariff Items 216 and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	588	116	.20	75	11,288	15.0
1954	566	113	.20	89	13,844	15.6
1955	576	132	.23	63	9,387	15.0
1956	571	134	.23	62	9,352	15.0
1957	508	118	.23	41	6,096	15.0
1958	573	125	.22	64	9,535	15.0
1959	535	133	.25	51	7,704	15.0
1960	577	155	.27	44	6,623	15.0
1961	501	137	.27	21	3,219	15.0
1962	597	158	.26	29	4,319	15.1
1963	545	142	.26	23	3,390	15.0
1964	673	178	.26	55	8,177	15.0
<u>2. United Kingdom</u>						
1953	196	39	.20	*	48	15.0
1954	102	24	.24	1	188	15.0
1955	224	69	.31	1	123	15.0
1956	276	72	.26	1	122	15.1
1957	303	78	.26	*	75	15.1
1958	253	63	.25	1	212	15.0
1959	313	83	.26	*	74	14.9
1960	380	110	.29	-	-	-
1961	403	116	.29	-	-	-
1962	493	129	.26	-	-	-
1963	458	119	.26	-	-	-
1964	491	127	.26	11	1,686	15.0

Table 20
(Cont'd)

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	lb.	\$	Value	Value	Collected	p.c. of
	(000)	(000)	\$/lb.	\$	\$	Dutiable
				(000)		Value
3. United States						
1953	235	39	.17	38	5,639	15.0
1954	205	34	.16	33	5,552	16.6
1955	130	21	.16	20	3,036	15.0
1956	134	26	.19	25	3,741	15.0
1957	64	10	.16	10	1,526	15.0
1958	65	10	.15	10	1,469	15.0
1959	44	7	.16	7	1,068	15.1
1960	42	10	.23	10	1,478	15.0
1961	26	5	.20	5	754	15.0
1962	39	10	.25	10	1,504	15.3
1963	46	11	.24	11	1,633	15.0
1964	5	2	.32	2	231	14.8
4. Netherlands						
1953	109	26	.24	26	3,896	15.0
1954	138	34	.25	34	5,095	15.0
1955	96	19	.20	19	2,918	15.0
1956	53	15	.29	15	2,314	15.0
1957	34	9	.27	9	1,368	15.0
1958	115	26	.23	26	3,937	15.0
1959	145	36	.25	36	5,379	15.0
1960	143	33	.23	33	4,875	15.0
1961	71	16	.23	16	2,410	15.0
1962	60	17	.29	17	2,617	15.0
1963	34	9	.28	9	1,407	15.0
1964	144	40	.28	38	5,693	15.0

(a) Beginning in 1964 renumbered as s.c. 409-82

Table 21

Imports: Acid, citric, s.c. 8013^(a)

Tariff Items 216, 711 and 851

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	1,858	415	.22	272	42,655	15.7
1954	1,100	255	.23	252	45,318	18.0
1955	167	47	.28	47	7,447	15.8
<u>2. United Kingdom</u>						
1953	728	183	.25	46	6,872	15.0
1954	413	104	.25	102	15,308	15.0
1955	86	21	.24	21	3,106	15.0
<u>3. United States</u>						
1953	245	61	.25	55	8,337	15.1
1954	4	1	.36	1	279	19.2
1955	81	26	.32	26	4,341	16.5
<u>4. Belgium & Luxembourg</u>						
1953	883	171	.19	171	27,324	16.0
1954	683	149	.22	149	29,731	20.0
1955	-	-	-	-	-	-

^(a) Beginning in 1956 included in s.c. 8022

Table 22

Imports: Soda, citrate of, s.c. 8340^(a)

Tariff Items 208t and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	82	20	.25	20	4,016	20.0
1954	103	26	.25	26	5,087	19.9
1955	87	24	.28	24	4,803	20.0
1956	65	19	.29	19	3,822	20.0
1957	5	2	.36	2	389	20.0
1958	3	2	.54	2	285	17.8
1959	3	2	.60	2	267	17.6
1960	2	1	.55	1	153	17.2
1961	3	2	.67	2	343	17.3
1962	2	1	.52	*	29	20.3
1963	2	1	.55	1	193	16.3
<u>2. United Kingdom</u>						
1953	-	-	-	-	-	-
1954	*	*	.41	*	14	15.4
1955-58	-	-	-	-	-	-
1959	1	1	.51	1	77	15.0
1960	1	1	.47	1	78	15.1
1961	2	1	.47	1	160	15.0
1962	2	1	.53	-	-	-
1963	2	1	.53	1	140	15.1
<u>3. United States</u>						
1953	82	20	.25	20	4,016	20.0
1954	103	26	.25	26	5,073	19.9
1955	87	24	.28	24	4,803	20.0
1956	65	19	.29	19	3,822	20.0
1957	5	2	.36	2	389	20.0
1958	3	2	.54	2	285	17.8
1959	2	1	.66	1	190	18.8
1960	1	*	.72	*	75	20.0
1961	1	1	1.32	1	183	19.9
1962	*	*	.50	*	29	20.3
1963	*	*	.67	*	53	20.9

(a) Beginning in 1964 included in s.c. 409-99

Table 23

Imports: Tartaric acid crystals or powder, s.c. 8021^(a)

Tariff Items 2080 and 711

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	lb.	\$	Value	Value	Collected	p.c. of
	(000)	(000)	\$/lb.	\$	\$	Dutiable
				(000)		Value
<u>1. Total</u>						
1953	812	187	.23	104	10,705	10.3
1954	763	198	.26	43	4,900	11.3
1955	819	260	.32	82	8,279	10.1
1956	758	249	.33	78	7,881	10.1
1957	727	240	.33	59	6,027	10.2
1958	666	230	.35	48	4,971	10.4
1959	826	295	.36	45	4,620	10.3
1960	952	340	.36	41	4,259	10.4
1961	932	340	.37	30	3,213	10.7
1962	816	299	.37	38	3,898	10.2
1963	848	256	.30	208	20,834	10.0
1964	609	169	.28	168	16,841	10.0
<u>2. United Kingdom</u>						
1953	318	83	.26	*	31	14.8
1954	580	156	.27	2	277	15.0
1955	552	178	.32	1	111	15.1
1956	509	172	.34	1	185	15.0
1957	540	184	.34	3	405	15.0
1958	528	184	.35	2	294	15.0
1959	695	252	.36	2	258	15.0
1960	828	302	.36	2	367	15.0
1961	847	314	.37	4	559	15.0
1962	693	260	.38	-	-	-
1963	139	49	.35	1	126	10.0
1964	*	*	.53	-	-	-
<u>3. United States</u>						
1953	4	2	.42	2	211	11.9
1954	1	*	.40	*	70	14.9
1955	1	1	.61	1	110	13.8
1956	2	2	.72	2	183	12.1
1957	2	1	.86	1	138	10.0
1958	3	2	.70	2	302	13.7
1959	11	4	.41	4	487	10.9
1960	10	3	.32	3	337	11.2
1961	2	1	.56	1	134	12.5
1962	2	2	.66	2	241	14.6
1963	1	1	1.05	1	162	16.7
1964	*	*	.65	*	25	19.4

Table 23
(Cont'd)

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	lb.	\$	Value	Value	Collected	p.c. of
	(000)	(000)	\$/lb.	\$	\$	Dutiable
				(000)		Value
4. Germany, Fed. Rep. of						
1953	45	10	.21	10	1,028	10.7
1954	3	1	.31	1	102	10.0
1955	92	29	.31	29	2,880	10.0
1956	64	19	.30	19	1,927	10.0
1957	34	10	.30	10	1,021	10.0
1958	32	10	.31	10	1,000	10.0
1959	31	10	.31	10	963	10.0
1960	62	19	.31	19	1,947	10.0
1961	30	10	.34	10	1,016	10.0
1962	63	21	.33	21	2,072	10.0
1963	204	67	.33	67	6,653	10.0
1964	177	50	.28	50	5,014	10.0

5. Italy

1953	438	91	.21	91	9,311	10.2
1954	174	39	.22	39	4,345	11.1
1955	163	48	.30	48	4,848	10.0
1956	105	34	.33	34	3,414	10.0
1957	116	35	.30	35	3,459	10.0
1958	103	34	.33	34	3,375	10.0
1959	89	29	.33	29	2,912	10.0
1960	41	13	.31	13	1,273	10.0
1961	24	7	.29	7	678	10.0
1962	21	6	.27	6	564	10.0
1963	34	9	.27	9	905	10.0
1964	9	4	.43	4	381	10.0

6. Spain

1953	4	1	.20	1	74	10.1
1954	4	1	.24	1	106	10.0
1955	6	2	.36	2	200	10.0
1956	20	6	.28	6	555	10.0
1957	-	-	-	-	-	-
1958	-	-	-	-	-	-
1959	-	-	-	-	-	-
1960	-	-	-	-	-	-
1961	20	6	.29	6	579	10.0
1962	33	9	.27	9	892	10.0
1963	467	129	.28	129	12,933	10.0
1964	420	113	.27	113	11,339	10.0

(a) Beginning in 1964 renumbered as s.c. 409-84, "Tartaric acid"

Table 24

Imports: 2,4-Dichlorophenoxyacetic acid, technical, s.c. 409-94^(a)

Tariff Items 219a(1), 219a(2) and 791

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value \$/lb.</u>
	<u>lb.</u> (000)	<u>\$</u> (000)	
	<u>1. Total</u>		
1964	933	288	.31
	<u>2. United States</u>		
1964	933	288	.31

(a) Prior to 1964 included in s.c. 8069

Table 25

Imports: Acid, acetylsalicylic, s.c. 8004^(a)

Tariff Items 216 and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
<u>1. Total</u>						
1953	798	390	.49	302	55,463	18.4
1954	665	340	.51	177	31,196	17.6
1955	699	374	.54	90	15,406	17.2
1956	776	417	.54	83	14,560	17.5
1957	875	460	.53	135	23,222	17.2
1958	1,175	636	.54	247	40,708	16.5
1959	1,031	546	.53	179	30,568	17.1
1960	950	509	.54	123	22,380	18.2
1961	1,332	729	.55	169	30,537	18.1
1962	1,334	734	.55	214	39,052	18.2
1963	1,549	912	.59	188	33,241	17.7
1964	1,852	897	.48	207	36,460	17.6
<u>2. United Kingdom</u>						
1953	153	87	.57	-	-	-
1954	294	163	.56	-	-	-
1955	521	289	.56	7	1,059	15.0
1956	597	333	.56	-	-	-
1957	594	325	.55	-	-	-
1958	679	389	.57	-	-	-
1959	649	368	.57	*	62	15.0
1960	693	386	.56	*	42	15.1
1961	987	570	.58	10	1,467	15.1
1962	894	520	.58	-	-	-
1963	1,205	733	.61	9	977	11.1
1964	1,154	698	.60	7	1,118	15.1
<u>3. United States</u>						
1953	645	302	.47	302	55,406	18.4
1954	360	163	.45	163	29,065	17.8
1955	174	83	.48	80	14,014	17.4
1956	171	80	.47	80	14,045	17.6
1957	275	132	.48	132	22,843	17.3
1958	470	235	.50	235	38,959	16.6
1959	285	137	.48	137	24,342	17.7
1960	223	109	.49	109	20,224	18.6
1961	222	112	.51	112	22,110	19.7
1962	278	147	.53	147	28,917	19.7
1963	216	115	.53	115	22,704	19.7
1964	217	115	.53	115	22,481	19.5

(a) Prior to 1955 included in s.c. 8007; beginning in 1964 renumbered as s.c. 409-93

Table 26

Imports: Acid, salicylic, s.c. 8011^(a)

Tariff Items 216 and 711

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	lb.	\$	Value	Value	Collected	p.c. of
	(000)	(000)	\$/lb.	\$	\$	Dutiable
				(000)		Value
<u>1. Total</u>						
1955	38	24	.64	22	3,519	15.8
1956	83	23	.27	20	3,018	15.0
1957	32	14	.43	8	1,198	15.6
1958	14	6	.43	5	801	15.0
1959	21	9	.43	6	952	15.0
1960	20	8	.39	5	739	15.0
1961	18	8	.43	4	678	15.1
1962	57	27	.47	7	1,132	16.1
1963	46	25	.54	10	1,565	15.0
<u>2. United Kingdom</u>						
1955	3	1	.51	*	35	15.0
1956	5	2	.47	-	-	-
1957	13	6	.48	-	-	-
1958	2	1	.40	-	-	-
1959	7	3	.39	-	-	-
1960	5	2	.37	-	-	-
1961	5	2	.41	-	-	-
1962	28	12	.44	-	-	-
1963	11	5	.44	*	13	15.5
<u>3. United States</u>						
1955	29	13	.47	13	2,059	16.5
1956	77	20	.26	20	3,018	15.0
1957	19	8	.40	8	1,198	15.6
1958	12	5	.44	5	801	15.0
1959	14	6	.45	6	952	15.0
1960	13	5	.41	5	690	15.0
1961	12	5	.45	4	596	15.1
1962	27	13	.48	5	875	16.4
1963	33	19	.58	10	1,433	15.0

(a) Prior to 1955 included in s.c. 8007; beginning in 1964 included in s.c. 409-99

Table 27

Imports: Cream of tartar in crystals, s.c. 8322^(a)

Tariff Items 208o, 208t, 711 and 851

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	291	63	.22	34	4,499	13.4
1954	247	48	.20	32	4,581	14.2
1955	306	74	.24	41	5,907	14.5
1956	319	84	.26	39	4,745	12.1
1957	276	71	.26	31	4,031	13.1
1958	299	76	.25	40	4,718	11.8
1959	380	100	.26	43	5,288	12.4
1960	311	86	.28	31	3,563	11.4
1961	355	103	.29	26	3,150	12.1
1962	312	96	.31	20	2,504	12.8
1963	344	103	.30	18	2,119	11.6
1964	379	108	.29	35	3,891	11.1
<u>2. United Kingdom</u>						
1953	112	28	.25	1	92	15.0
1954	66	16	.23	-	-	-
1955	124	35	.28	2	251	15.0
1956	158	45	.29	*	49	14.9
1957	148	41	.28	1	141	15.0
1958	136	38	.28	2	284	15.0
1959	223	61	.27	4	574	15.0
1960	215	60	.28	5	835	16.5
1961	262	79	.30	2	230	15.0
1962	252	81	.32	4	622	15.9
1963	100	32	.32	-	-	-
1964	-	-	-	-	-	-

Table 27
(Cont'd)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
<u>3. United States</u>						
1953	22	5	.22	5	947	19.8
1954	19	5	.26	4	715	16.5
1955	6	2	.27	2	304	20.0
1956	*	*	.35	*	12	21.1
1957	5	2	.43	2	403	20.0
1958	1	*	.30	*	33	10.1
1959	*	1	1.41	1	134	20.0
1960	1	2	1.52	2	252	15.4
1961	2	2	.89	2	224	14.7
1962-64	-	-	-	-	-	-
<u>4. Italy</u>						
1953	133	25	.19	23	2,473	10.9
1954	116	20	.18	20	2,738	13.5
1955	124	26	.21	26	3,805	14.5
1956	113	28	.24	28	3,418	12.3
1957	123	28	.23	28	3,487	12.6
1958	135	32	.24	32	3,817	11.9
1959	142	35	.25	35	4,253	12.2
1960	89	23	.26	23	2,326	10.0
1961	80	20	.25	20	2,376	12.0
1962	51	14	.27	14	1,677	12.3
1963	65	16	.25	16	1,939	11.8
1964	124	31	.25	..	..	..
<u>5. Australia</u>						
1953-62	-	-	-	-	-	-
1963	171	54	.31	-	-	-
1964	238	73	.31	-	-	-

(a) Beginning in 1964 renumbered as s.c. 409-85, "Potassium bitartrate (cream of tartar)"; also includes part of s.c. 8332 and tariff item 208

Table 28

Imports: Antimony salts, viz.: tartar emetic, chloride and lactate (antimonine), s.c. 8271(a)

Tariff Items 208 and 851

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	<u>Dutiable</u>
				(000)		<u>Value</u>
<u>1. Total</u>						
1953	30	17	.58	-	-	-
1954	27	15	.54	-	-	-
1955	39	20	.51	-	-	-
1956	20	12	.62	-	-	-
1957	25	17	.66	-	-	-
1958	42	20	.48	-	-	-
1959	39	20	.51	*	15	10.1
1960	37	18	.48	*	15	10.1
1961	45	23	.52	-	-	-
1962	33	22	.66	2	314	14.5
1963	26	19	.71	2	162	10.0
<u>2. United States</u>						
1953	26	15	.59	-	-	-
1954	25	14	.55	-	-	-
1955	36	19	.51	-	-	-
1956	18	11	.63	-	-	-
1957	23	16	.67	-	-	-
1958	42	20	.48	-	-	-
1959	39	20	.51	*	15	10.1
1960	37	18	.48	*	15	10.1
1961	45	23	.52	-	-	-
1962	31	20	.65	2	314	14.5
1963	26	19	.71	2	162	10.0

(a) Beginning in 1964 included in s.c. 404-99 and 409-99

Table 29

Imports: Tricresyl phosphates, s.c. 412-82^(a)

Tariff Items 208t and 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	<u>Value</u>
				(000)		
			<u>1. Total</u>			
1964	1,637	534	.33	244	36,510	15.0
			<u>2. United Kingdom</u>			
1964	647	194	.30	*	28	13.8
			<u>3. United States</u>			
1964	990	340	.34	243	36,482	15.0

^(a) Prior to 1964 included in s.c. 8415 and 8422

Table 30

Imports: Hexamethylene-diamine, s.c. 411-29^(a)

Tariff Items 921 and 923

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value \$/lb.</u>
	<u>lb.</u> (000)	<u>\$</u> (000)	
	<u>1. Total</u>		
1964	3,405	1,773	.52
	<u>2. United States</u>		
1964	3,405	1,773	.52

(a) Prior to 1964 included in s.c. 8410

Table 31

Imports: Aniline oil, crude, s.c. 8093^(a)

Tariff Item 203

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value \$/lb.</u>
	<u>lb.</u> (000)	<u>\$</u> (000)	
	<u>1. Total</u>		
1953	-	-	-
1954	5	1	.22
1955	5	1	.26
1956	5	1	.20
1957	36	7	.19
	<u>2. United States</u>		
1953	-	-	-
1954	5	1	.22
1955	5	1	.26
1956	5	1	.20
1957	36	7	.19

(a) Beginning in 1958 included in s.c. 8094

Table 32

Imports: Aniline oil, crude, aniline salts and alizarin, s.c. 8094^(a)

Tariff Item 203

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value \$/lb.</u>
	<u>lb.</u>	<u>\$</u>	
	(000)	(000)	
	<u>1. Total</u>		
1953	40	32	.79
1954	49	33	.68
1955	84	51	.61
1956	65	51	.78
1957	46	38	.82
1958	179	50	.28
1959	83	24	.29
1960	88	27	.31
1961	125	28	.22
	<u>2. United Kingdom</u>		
1953	14	18	1.24
1954	36	21	.58
1955	71	47	.65
1956	48	45	.93
1957	30	34	1.14
1958	53	29	.55
1959	52	17	.34
1960	53	20	.39
1961	30	13	.42
	<u>3. United States</u>		
1953	21	7	.34
1954	7	2	.24
1955	10	3	.27
1956	3	1	.35
1957	4	2	.40
1958	61	12	.19
1959	19	4	.22
1960	13	3	.22
1961	50	9	.17

Table 32
(Cont'd)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>
	(000)	(000)	\$/lb.
<u>4. Germany, Fed. Rep. of</u>			
1953	5	7	1.32
1954	5	4	.92
1955	3	3	.87
1956	14	4	.32
1957	12	2	.18
1958	65	8	.13
1959	11	1	.13
1960	22	3	.13
1961	44	6	.14

(a) Prior to 1958, s.c. 8094 worded: "Aniline salts, alizarin and artificial alizarin". Aniline oil, crude was in s.c. 8093 prior to 1958; beginning in 1962 it was included in s.c. 8415 and 8900

Table 33

Imports: Coal tar base or salt for use in the manufacture of coal
tar dyes, s.c. 8095(a)

Tariff Items 203e and 203f

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>
	(000)	(000)	\$/lb.
<u>1. Total</u>			
1953	1,076	1,030	.96
1954	999	673	.67
1955	1,320	1,020	.77
1956	983	864	.88
1957	983	800	.81
1958	1,276	897	.70
1959	1,423	897	.63
1960	1,171	742	.63
1961	1,153	818	.71
<u>2. United Kingdom</u>			
1953	167	127	.76
1954	180	100	.55
1955	140	133	.95
1956	95	96	1.01
1957	106	94	.89
1958	89	77	.86
1959	190	84	.44
1960	173	78	.45
1961	81	64	.78
<u>3. United States</u>			
1953	719	710	.99
1954	463	399	.86
1955	562	530	.94
1956	553	517	.93
1957	510	467	.91
1958	415	395	.95
1959	563	475	.84
1960	564	445	.79
1961	516	422	.82

Table 33
(Cont'd)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>
	(000)	(000)	\$/lb.
<u>4. Germany, Fed. Rep. of</u>			
1953	155	116	.75
1954	322	143	.44
1955	566	311	.55
1956	284	205	.72
1957	290	196	.68
1958	675	366	.54
1959	570	278	.49
1960	389	198	.51
1961	518	306	.59

(a) Beginning in 1962 included in s.c. 8900 and 8913

Table 34

Imports: Iron liquor and red liquor adapted for dyeing and calico printing, s.c. 8107(a)

Tariff Item 203

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value \$/lb.</u>
	<u>lb.</u> (000)	<u>\$</u> (000)	
	<u>1. Total</u>		
1953	30	4	.15
1954	12	2	.12
1955	15	1	.09
1956	11	2	.15
1957	9	1	.10
	<u>2. United States</u>		
1953	30	4	.15
1954	12	2	.12
1955	15	1	.09
1956	11	2	.15
1957	9	1	.10

(a) Beginning in 1958 included in s.c. 8104

Table 35

Imports: Sodium glutamate, s.c. 8355^(a)

Tariff Items 208t, 220a(i) and 711

Year	Total Imports		Unit Value	Dutiable Value	Duty Collected	Duty as p.c. of Dutiable Value
	lb.	\$	\$/lb.	\$	\$	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	915	1,483	1.62	1,483	256,896	17.3
1954	893	1,339	1.50	1,339	220,041	16.4
1955	1,192	1,677	1.41	1,677	254,890	15.2
1956	354	411	1.16	411	81,311	19.8
1957	462	505	1.09	505	98,449	19.5
1958	652	661	1.01	661	131,936	20.0
1959	639	604	.95	604	121,664	20.1
1960	1,320	1,120	.85	1,120	224,039	20.0
1961	1,155	1,005	.87	1,005	200,926	20.0
1962	1,186	922	.78	922	203,143	22.0
1963	2,231	1,289	.58	1,289	267,374	20.8
1964	3,374	1,761	.52	1,761	350,415	19.9
<u>2. United States</u>						
1953	751	1,263	1.68	1,263	201,892	16.0
1954	636	1,009	1.59	1,009	152,296	15.1
1955	829	1,280	1.54	1,280	193,203	15.1
1956	294	345	1.17	345	68,219	19.8
1957	404	446	1.10	446	86,594	19.4
1958	595	605	1.02	605	120,768	20.0
1959	476	467	.98	467	93,090	19.9
1960	260	283	1.09	283	56,659	20.0
1961	356	364	1.02	364	72,785	20.0
1962	758	587	.77	587	132,200	22.5
1963	1,826	1,105	.61	1,105	230,129	20.8
1964	1,544	879	.57	879	174,862	19.9
<u>3. Japan</u>						
1953	164	220	1.34	220	55,004	25.0
1954	257	329	1.28	329	67,745	20.6
1955	338	368	1.09	368	57,284	15.6
1956	55	60	1.09	60	12,089	20.0
1957	21	22	1.09	22	4,475	20.0
1958	10	10	1.01	10	1,954	20.0
1959	10	10	1.04	10	2,022	20.0
1960	6	7	1.05	7	1,324	20.0
1961	11	9	.84	9	1,812	20.0
1962	-	-	-	-	-	-
1963	2	1	.58	1	251	19.8
1964	858	423	.49	423	84,598	20.0

(a) Beginning in 1964 renumbered as s.c. 411-45

Table 36

Imports: Ethanolamines (mono-, di-, tri-), s.c. 411-34^(a)

Tariff Item 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
<u>1. Total</u>						
1964	308	114	.37	83	13,508	16.3
<u>2. United States</u>						
1964	308	114	.37	83	13,508	16.3

(a) Prior to 1964 included in s.c. 8415

Table 37

Imports: Urea, s.c. 416-31^(a)

Tariff Items 663, 663b, 711 and 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
			<u>1. Total</u>			
1964	9,665	563	.06	12	745	6.2
			<u>2. United States</u>			
1964	9,643	562	.06	11	564	5.1

(a) Prior to 1964 included in s.c. 8150, 8167, 8415 and 8422

Table 38

Imports: Hexamethylene-tetramine, s.c. 411-63^(a)

Tariff Items 208t and 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
			<u>1. Total</u>			
1964	1,840	351	.19	44	6,658	15.0
			<u>2. United Kingdom</u>			
1964	20	4	.22	-	-	-
			<u>3. United States</u>			
1964	964	225	.23	37	5,494	15.0
			<u>4. Germany, Fed. Rep. of</u>			
1964	856	121	.14	8	1,164	15.0

(a) Prior to 1964 included in s.c. 8415 and 8422

Table 39

Imports: Acrylonitrile, s.c. 411-71^(a)

Tariff Items 208t, 219e and 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
	<u>1. Total</u>					
1964	12,264	2,240	.18	21	3,109	15.0
	<u>2. United States</u>					
1964	12,264	2,240	.18	21	3,109	15.0

(a) Prior to 1964 included in s.c. 8071, 8415 and 8422

Table 40

Imports: Acetonitrile, s.c. 411-74^(a)

Tariff Item 208t

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
	<u>1. Total</u>					
1964	999	303	.30	-	-	-
	<u>2. United States</u>					
1964	999	303	.30	-	-	-

(a) Prior to 1964 included in s.c. 8415

Table 41

Imports: Di-isocyanates, s.c. 411-81^(a)

Tariff Item 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u> <u>p.c. of</u> <u>Dutiable</u> <u>Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
	<u>1. Total</u>					
1964	5,653	3,184	.56	239	39,768	16.6
	<u>2. United Kingdom</u>					
1964	384	253	.66	*	21	14.9
	<u>3. United States</u>					
1964	5,269	2,931	.56	239	39,747	16.6

(a) Prior to 1964 included in s.c. 8422

Imports: Xanthates and sulpho-thio-phosphoric (dithio-phosphoric) compounds, for concentrating ores, metals or minerals, s.c. 8016(a)

Tariff Item 208u

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u> \$/lb.
	<u>lb.</u> (000)	<u>\$</u> (000)	
	<u>1. Total</u>		
1953	5,850	1,401	.24
1954	6,398	1,563	.24
1955	7,173	1,723	.24
1956	6,775	1,639	.24
1957	6,658	1,700	.26
1958	5,433	1,409	.26
1959	4,727	1,209	.26
1960	5,186	1,369	.26
1961	5,481	1,542	.28
1962	4,078	1,222	.30
1963	3,736	1,205	.32
1964 (b)	4,450	1,205	.27
	<u>2. United States</u>		
1953	5,716	1,375	.24
1954	6,053	1,496	.25
1955	6,974	1,685	.24
1956	6,448	1,575	.24
1957	6,345	1,640	.26
1958	5,081	1,332	.26
1959	4,205	1,102	.26
1960	4,574	1,244	.27
1961	4,881	1,414	.29
1962	3,423	1,088	.32
1963	3,082	1,067	.35
1964	3,282	960	.29
	<u>3. Germany, Fed. Rep. of</u>		
1953	66	14	.22
1954	265	52	.20
1955	118	25	.21
1956	246	49	.20
1957	254	48	.19
1958	351	77	.22
1959	522	107	.21
1960	612	126	.21
1961	589	127	.22
1962	462	103	.22
1963	478	111	.23
1964	505	129	.25

(a) Beginning in 1964 renumbered as s.c. 412-04, "Xanthates"; also included in s.c. 429-17

(b) In 1964 \$45,384 worth of dutiable imports came from the U.S.; the duty collected was \$2,267

Table 43

Imports: Methionine, s.c. 412-72^(a)

Tariff Items 208t and 219h

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	<u>p.c. of</u>
				(000)		<u>Dutiable</u>
						<u>Value</u>
<u>1. Total</u>						
1964	517	534	1.03	26	3,888	15.0
<u>2. United States</u>						
1964	132	146	1.11	24	3,603	15.0
<u>3. Germany, Fed. Rep. of</u>						
1964	294	305	1.04	2	285	15.0
<u>4. France</u>						
1964	70	62	.88	-	-	-

(a) Prior to 1964 included in s.c. 8415

Table 44

Imports: Thiazoles (except sulfathiazole), s.c. 412-32^(a)

Tariff Items 208t and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	1,275	941	.74	589	90,665	15.4
<u>2. United Kingdom</u>						
1964	778	544	.70	249	36,332	14.6
<u>3. United States</u>						
1964	497	397	.80	340	54,333	16.0

(a) Prior to 1964 included in s.c. 8415

Table 45

Imports: Morpholine, s.c. 412-42^(a)

Tariff Item 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	523	202	.39	202	31,221	15.4
<u>2. United States</u>						
1964	523	202	.39	202	31,221	15.4

(a) Prior to 1964 included in s.c. 8415

Table 46

Imports: Vitamin A, s.c. 874-35^(a)

Tariff Items 208t, 220(i) and 711

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1964	902	901	173,917	19.3
<u>2. United Kingdom</u>				
1964	11	11	1,624	15.0
<u>3. United States</u>				
1964	538	538	102,910	19.1
<u>4. Netherlands</u>				
1964	220	220	43,936	20.0
<u>5. Switzerland</u>				
1964	114	114	21,926	19.2

(a) Prior to 1964 included in s.c. 8074 and 8415

Table 47

Imports: Acid, ascorbic, s.c., 8024^(a)

Tariff Items 216 and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	42	350	8.33	350	69,883	19.9
1954	34	250	7.36	250	49,915	20.0
1955	43	267	6.21	267	52,871	19.8
1956	..	303	..	303	60,564	20.0
1957	..	274	..	274	54,411	19.9
1958	..	391	..	391	71,600	18.3
1959	..	411	..	410	78,988	19.2
1960	..	527	..	527	103,028	19.5
1961	..	514	..	513	99,571	19.4
1962	..	512	..	512	111,939	21.9
1963	..	477	..	463	93,699	20.2
1964	..	653	..	653	129,660	19.9
<u>2. United States</u>						
1953	42	350	8.33	350	69,883	19.9
1954	34	250	7.36	250	49,915	20.0
1955	41	256	6.25	256	51,131	20.0
1956	..	179	..	179	35,684	19.9
1957	..	238	..	238	47,266	19.9
1958	..	273	..	272	47,939	17.6
1959	..	215	..	214	39,899	18.7
1960	..	402	..	402	78,370	19.5
1961	..	377	..	377	72,212	19.2
1962	..	209	..	209	42,543	20.3
1963	..	134	..	119	24,250	20.3
1964	..	297	..	297	58,663	19.8

Table 47
(Cont'd)

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	lb.	\$	Value	Value	Collected	p.c. of
	(000)	(000)	\$/lb.	\$	\$	Dutiable
				(000)		Value
<u>3. Germany, Fed. Rep. of</u>						
1953-58	-	-	-	-	-	-
1959	..	2	..	2	309	20.0
1960	..	83	..	83	16,436	19.7
1961	..	131	..	131	26,240	20.0
1962	..	240	..	240	55,296	23.1
1963	..	101	..	101	20,903	20.7
1964	..	310	..	310	62,038	20.0
<u>4. Switzerland</u>						
1953-55	-	-	-	-	-	-
1956	..	108	..	108	21,633	20.0
1957	..	31	..	31	6,223	20.0
1958	..	112	..	112	22,389	20.0
1959	..	154	..	154	30,785	20.0
1960	..	22	..	22	4,454	20.0
1961	-	-	-	-	-	-
1962	-	-	-	-	-	-
1963	..	195	..	195	39,053	20.0
1964	..	30	..	30	5,807	19.3

(a) Beginning in 1964 renumbered as s.c. 874-05; also includes part of former s.c. 8319

Table 48

Imports: Riboflavin (also known as Vitamin B₂, Vitamin G,
Lactoflavin), s.c. 8432(a)

Tariff Items 208t, 219f and 711

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable</u> <u>Value</u> \$ (000)	<u>Duty</u> <u>Collected</u> \$	<u>Duty as</u> <u>p.c. of</u> <u>Dutiable</u> <u>Value</u>
<u>1. Total</u>				
1953	459	275	41,674	15.2
1954	348	247	44,323	17.9
1955	418	230	40,754	17.7
1956	439	168	31,210	18.6
1957	337	158	28,077	17.8
1958	371	160	28,859	18.1
1959	396	148	27,006	18.3
1960	335	125	22,423	17.9
1961	377	155	23,717	15.3
1962	410	181	27,774	15.3
1963	398	169	27,492	16.3
1964	208	204	31,528	15.0

2. United States

1953	459	275	41,674	15.2
1954	348	247	44,323	17.9
1955	415	227	40,065	17.7
1956	425	155	28,490	18.4
1957	312	132	23,004	17.4
1958	327	119	21,152	17.8
1959	383	135	24,960	18.5
1960	303	95	17,051	18.0
1961	275	53	8,331	15.7
1962	278	50	7,756	15.7
1963	323	94	16,243	17.2
1964	95	93	14,646	15.8

Table 48
(Cont'd)

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>3. Switzerland</u>				
1955	3	3	689	20.0
1956	12	12	2,411	20.0
1957	25	25	5,073	20.0
1958	37	34	6,326	18.6
1959	10	10	1,462	15.0
1960	24	22	3,795	17.0
1961	85	85	12,701	15.0
1962	130	130	19,633	15.1
1963	73	73	10,989	15.0
1964	96	96	14,380	15.0

- (a) Beginning in 1964 renumbered as s.c. 874-25, "Riboflavin (vitamin B-2) pharmaceutical grade", which includes part of s.c. 8415; also included in s.c. 878-89, "Antibiotic and feed supplements"

Table 49

Imports: Vitamin B-12 for human use, s.c. 874-48^(a)

Tariff Items 208t, 220(i) and 711

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1964	192	192	39,149	20.4
<u>2. United States</u>				
1964	148	148	29,205	19.7
<u>3. France</u>				
1964	33	33	7,778	23.6

(a) Prior to 1964 included in s.c. 8074 and 8415

Table 50

Imports: Vitamin E, tocopherol, s.c. 874-55^(a)

Tariff Items 208t and 711

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1964	105	105	16,511	15.7
<u>2. United States</u>				
1964	98	98	15,410	15.8

(a) Prior to 1964 included in s.c. 8415

Table 51

Imports: Acid, nicotinic, s.c. 8010^(a)

Tariff Items 216, 216i and 711

Year	Total Imports lb. (000)	\$ (000)	Unit Value \$/lb.	Dutiable Value \$ (000)	Duty Collected \$	Duty as p.c. of Dutiable Value
<u>1. Total</u>						
1953	83	252	3.03	251	37,722	15.0
1954	87	244	2.81	242	36,297	15.0
1955	206	458	2.23	447	67,010	15.0
1956	79	159	2.02	152	22,777	15.0
1957	45	99	2.20	97	14,488	15.0
1958	20	49	2.44	47	9,045	19.4
1959	53	92	1.72	87	16,955	19.4
1960	71	98	1.38	95	18,542	19.5
1961	136	169	1.24	94	16,029	17.1
1962	151	179	1.19	104	16,280	15.6
1963	229	245	1.07	100	14,981	15.1
1964	..	164	..	161	24,663	15.3
<u>2. United Kingdom</u>						
1953	-	-	-	-	-	-
1954	1	2	2.84	-	-	-
1955	-	-	-	-	-	-
1956	*	1	2.54	-	-	-
1957	-	-	-	-	-	-
1958	-	-	-	-	-	-
1959	1	1	1.31	1	216	15.0
1960	5	7	1.33	7	1,073	15.1
1961	12	17	1.37	-	-	-
1962	4	6	1.48	-	-	-
1963	-	-	-	-	-	-
1964	..	3	..	-	-	-
<u>3. United States</u>						
1953	83	252	3.03	251	37,722	15.0
1954	85	239	2.80	239	35,798	15.0
1955	201	442	2.21	440	66,009	15.0
1956	76	148	1.96	144	21,658	15.0
1957	44	97	2.18	97	14,488	15.0
1958	18	40	2.27	40	7,796	19.4
1959	47	81	1.73	81	15,744	19.5
1960	34	54	1.60	54	10,760	20.0
1961	39	47	1.21	28	5,027	17.8
1962	15	20	1.35	10	1,617	15.8
1963	10	18	1.80	13	1,960	15.3
1964	..	56	..	56	8,827	15.7

Table 51
(Cont'd)

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	lb.	\$	Value	Value	Collected	p.c. of
	(000)	(000)	\$/lb.	\$	\$	Dutiable
				(000)		Value
<u>4. France</u>						
1953	-	-	-	-	-	-
1954	-	-	-	-	-	-
1955	*	1	2.58	1	155	15.0
1956	1	2	2.27	*	37	15.0
1957	*	2	4.33	-	-	-
1958	-	-	-	-	-	-
1959	2	3	1.86	-	-	-
1960	13	13	1.05	11	2,186	20.0
1961	22	26	1.19	5	1,073	20.0
1962	34	37	1.07	5	1,160	25.0
1963	45	43	.96	-	-	-
1964	-	-	-	-	-	-
<u>5. Switzerland</u>						
1953	-	-	-	-	-	-
1954	*	1	3.32	1	219	15.0
1955	4	11	2.71	1	223	15.0
1956	*	*	2.71	*	22	14.8
1957	*	1	2.29	-	-	-
1958	1	5	8.74	5	1,045	19.8
1959	2	3	1.68	3	544	20.0
1960	1	2	1.62	2	315	19.2
1961	29	38	1.31	29	5,005	17.4
1962	65	81	1.24	68	10,131	15.0
1963	112	119	1.06	63	9,442	15.0
1964	..	86	..	86	12,847	15.0

(a) Beginning in 1964 renumbered as s.c. 874-22; also includes part of former s.c. 8415

Table 52

Imports: Vitamins and preparations pharmaceutical grade n.e.s.,
s.c. 874-99(a)

Tariff Items 208t, 216, 220(i), 220(ii), 220a(i) and 711

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1964	1,143	1,050	199,192	19.0
<u>2. United Kingdom</u>				
1964	108	27	4,167	15.6
<u>3. United States</u>				
1964	794	787	150,060	19.1
<u>4. Switzerland</u>				
1964	120	120	22,434	18.8

(a) Prior to 1964 included in s.c. 8022, 8074, 8075, 8319, 8366 and 8415

Table 53

Imports: Cortical hormones, s.c. 871-34^(a)

Tariff Items 208t, 220(i), 220(ii), 220a(i) and 711

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1964	1,160	764	127,158	16.7
<u>2. United Kingdom</u>				
1964	426	51	7,813	15.3
<u>3. United States</u>				
1964	654	641	108,030	16.9

^(a) Prior to 1964 included in s.c. 8074, 8075 and 8415

Table 54

Imports: Sex hormones, s.c. 871-60^(a)

Tariff Items 208t, 220(i) and 711

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1964	1,577	1,402	218,615	15.6
<u>2. United Kingdom</u>				
1964	139	134	21,056	15.7
<u>3. United States</u>				
1964	197	189	35,192	18.7
<u>4. Panama</u>				
1964	1,005	1,005	150,675	15.0

^(a) Prior to 1964 included in s.c. 8074 and 8415

Table 55

Imports: Papaine, s.c. 8079^(a)

Tariff Item 153b

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	59	35	1,756	5.0
1954	56	16	822	5.0
1955	23	13	651	5.0
1956	65	25	1,256	5.0
1957	48	11	553	5.0
1958	43	16	776	5.0
1959	74	35	1,744	5.0
1960	72	70	3,994	5.7
1961	104	84	4,239	5.1
1962	123	123	6,163	5.0
1963	162	162	8,092	5.0
1964	161	161	8,287	5.1
<u>2. United States</u>				
1953	36	35	1,756	5.0
1954	18	16	822	5.0
1955	9	9	441	5.0
1956	19	19	927	5.0
1957	11	11	536	5.0
1958	16	16	776	5.0
1959	53	35	1,744	5.0
1960	62	62	3,080	5.0
1961	104	84	4,239	5.1
1962	115	115	5,753	5.0
1963	162	162	8,092	5.0
1964	161	161	8,287	5.1
<u>3. Africa, British East</u>				
1953	23	-	-	-
1954	38	-	-	-
1955	7	-	-	-
1956	34	-	-	-
1957	30	*	17	5.0
1958	27	-	-	-
1959	20	-	-	-
1960-64	-	-	-	-

^(a) Beginning in 1964 renumbered as s.c. 879-93

Table 56

Imports: Caffeine and salts of, s.c. 8052^(a)

Tariff Items 208t and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
	<u>1. Total</u>					
1953	47	109	2.32	106	18,613	17.6
1954	3	8	2.31	8	1,418	17.8
1955	127	335	2.64	335	64,455	19.2
1956	186	414	2.23	398	60,997	15.3
1957	169	365	2.15	364	54,757	15.1
1958	187	402	2.15	391	58,614	15.0
1959	244	480	1.97	470	70,466	15.0
1960	130	218	1.67	210	31,623	15.0
1961	221	398	1.80	369	55,310	15.0
1962	208	375	1.80	256	38,391	15.0
1963	225	383	1.70	269	40,340	15.0
1964	..	366	..	247	37,102	15.0
	<u>2. United Kingdom</u>					
1953	21	51	2.43	47	7,108	15.0
1954	1	4	3.19	4	536	15.0
1955	-	-	-	-	-	-
1956	8	26	3.14	10	1,465	15.0
1957	2	5	2.59	5	680	15.0
1958	7	17	2.44	6	840	15.0
1959	8	18	2.23	8	1,134	15.0
1960	3	7	2.05	-	-	-
1961	14	29	2.04	*	25	14.8
1962	56	119	2.13	-	-	-
1963	60	127	2.10	12	1,831	15.1
1964	..	126	..	7	1,080	15.0
	<u>3. United States</u>					
1953	2	3	2.18	3	615	18.4
1954	*	*	4.92	*	12	20.3
1955	63	175	2.80	175	35,088	20.0
1956	*	*	3.20	*	16	20.0
1957	*	*	4.47	*	10	14.9
1958	*	*	2.35	*	33	14.8
1959	*	*	2.06	*	43	15.0
1960	3	5	1.58	5	725	15.0
1961	*	*	1.41	*	57	20.1
1962	*	1	2.58	1	155	15.0
1963	1	2	2.21	2	256	16.9
1964	..	1	..	1	184	19.5

Table 56
(Cont'd)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
<u>4. Germany, Fed. Rep. of</u>						
1953	16	39	2.34	39	7,593	19.7
1954	2	4	2.03	4	811	20.0
1955	31	74	2.38	74	14,829	20.0
1956	93	199	2.14	199	31,039	15.6
1957	84	167	1.98	167	25,203	15.1
1958	78	154	1.99	154	23,170	15.0
1959	115	200	1.74	200	29,947	15.0
1960	82	130	1.59	130	19,458	15.0
1961	91	142	1.56	142	21,293	15.0
1962	100	155	1.55	155	23,227	15.0
1963	97	147	1.51	147	22,003	15.0
1964	..	129	..	129	19,399	15.0
<u>5. Netherlands</u>						
1953	7	16	2.20	16	3,129	20.0
1954	-	-	-	-	-	-
1955	12	34	2.79	34	6,819	20.0
1956	64	139	2.16	139	20,822	15.0
1957	65	154	2.38	154	23,158	15.0
1958	76	175	2.31	175	26,274	15.0
1959	84	191	2.28	191	28,597	15.0
1960	-	-	-	-	-	-
1961	44	95	2.14	95	14,290	15.0
1962	12	25	2.09	25	3,691	15.0
1963	67	108	1.61	108	16,168	15.0
1964	..	105	..	105	15,762	15.0

(a) Beginning in 1964 renumbered as s.c. 879-72

Table 57

Imports: Codeine and salts of, s.c. 8054^(a)

Tariff Items 208t and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>oz.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)	<u>\$/oz.</u>	<u>\$</u>	<u>\$</u>	<u>Value</u>
				(000)		
<u>1. Total</u>						
1953	70	374	5.37	12	1,767	15.0
1954	140	704	5.03	26	3,924	15.0
1955	119	591	4.94	57	8,496	15.0
1956	93	455	4.91	17	2,589	15.0
1957	105	516	4.92	6	953	15.0
1958	121	600	4.94	11	1,605	15.0
1959	131	646	4.93	5	759	15.0
1960	149	733	4.92	27	4,044	15.0
1961	157	809	5.16	74	11,141	15.0
1962	153	837	5.49	61	9,188	15.0
1963	166	902	5.44	35	5,211	15.0

2. United Kingdom

1953	51	257	5.03	-	-	-
1954	119	589	4.96	-	-	-
1955	93	462	4.98	-	-	-
1956	83	400	4.81	-	-	-
1957	88	414	4.69	-	-	-
1958	114	568	4.98	-	-	-
1959	130	641	4.92	-	-	-
1960	141	689	4.89	-	-	-
1961	138	708	5.12	-	-	-
1962	143	775	5.41	-	-	-
1963	159	868	5.45	-	-	-

(a) Beginning in 1964 included in s.c. 879-30

Table 58

Imports: Cocaine, s.c. 8052^(a)

Tariff Items 208t and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>oz.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)	<u>\$/oz.</u>	<u>\$</u>	<u>\$</u>	<u>Dutiable</u>
				(000)		<u>Value</u>
<u>1. Total</u>						
1953	2	23	11.18	18	2,688	15.0
1954	2	28	14.96	21	3,185	15.0
1955	1	13	11.34	-	-	-
1956	1	15	12.01	-	-	-
1957	1	14	11.39	-	-	-
1958	1	16	12.35	-	-	-
1959	1	9	11.44	-	-	-
1960	1	14	11.78	-	-	-
1961	1	15	12.31	-	-	-
1962	1	12	13.15	-	-	-
1963	1	16	13.59	-	-	-
<u>2. United Kingdom</u>						
1953	1	5	10.09	-	-	-
1954	1	7	11.64	-	-	-
1955	1	13	11.34	-	-	-
1956	1	15	12.01	-	-	-
1957	1	14	11.39	-	-	-
1958	1	16	12.35	-	-	-
1959	1	9	11.44	-	-	-
1960	1	14	11.78	-	-	-
1961	1	15	12.31	-	-	-
1962	1	12	13.15	-	-	-
1963	1	16	13.59	-	-	-

(a) Beginning in 1964 included in s.c. 879-30

Table 59

Imports: Opium and derivatives, n.o.p., s.c. 8056^(a)

Tariff Items 208t, 221, 222 and 711

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	oz.	\$	Value	Value	Collected	p.c. of
	(000)	(000)	\$/oz.	\$	\$	Dutiable
				(000)		Value
<u>1. Total</u>						
1953	3	3	.87	3	255	8.6
1954	14	51	3.65	6	917	16.1
1955	11	38	3.46	10	1,644	16.4
1956	12	50	4.11	10	1,905	18.6
1957	10	35	3.66	10	1,694	16.9
1958	11	50	4.69	17	2,788	16.5
1959	10	41	3.98	15	2,435	16.5
1960	10	38	3.97	16	2,763	17.0
1961	10	44	4.51	17	2,714	16.3
1962	9	44	4.94	18	2,857	15.8
1963	8	48	5.62	17	2,850	16.4
<u>2. United Kingdom</u>						
1953	3	3	.87	3	255	8.6
1954	11	47	4.17	2	251	13.8
1955	10	30	3.13	2	182	10.2
1956	10	40	4.17	1	149	13.6
1957	7	27	3.65	2	319	13.2
1958	8	35	4.30	2	302	13.5
1959	8	29	3.79	3	377	13.7
1960	7	24	3.39	2	321	13.1
1961	7	28	3.86	1	61	10.2
1962	7	28	4.13	2	163	10.2
1963	6	31	4.78	1	81	10.4
<u>3. United States</u>						
1953	-	-	-	-	-	-
1954	*	2	4.70	2	295	17.3
1955	1	4	5.45	4	780	19.0
1956	2	8	4.72	7	1,481	19.8
1957	1	3	5.68	3	573	20.0
1958	1	4	5.79	4	798	20.0
1959	1	4	6.10	4	805	19.8
1960	1	6	6.51	6	1,272	19.9
1961	1	5	7.39	5	956	20.0
1962	*	4	9.61	4	842	20.0
1963	1	5	8.36	5	1,080	20.2

(a) Prior to 1958 includes s.c. 8057; beginning in 1964 included in s.c. 879-30

Imports: Quinine salts, s.c. 8059^(a)

Tariff Item 206

Year	Total Imports		Unit Value	Dutiable Value	Duty Collected	Duty as p.c. of Dutiable Value
	oz. (000)	\$ (000)	\$/oz.	\$ (000)	\$	
<u>1. Total</u>						
1953	43	16	.37	-	-	-
1954	76	25	.33	-	-	-
1955	101	34	.34	-	-	-
1956	63	21	.33	-	-	-
1957	60	19	.31	-	-	-
1958	79	25	.31	-	-	-
1959	51	15	.29	-	-	-
1960	63	17	.27	-	-	-
1961	57	19	.33	-	-	-
1962	65	28	.42	*	48	15.0
1963	89	40	.44	2	302	15.0
<u>2. United Kingdom</u>						
1953	-	-	-	-	-	-
1954	1	*	.39	-	-	-
1955	3	1	.53	-	-	-
1956	14	4	.30	-	-	-
1957	-	-	-	-	-	-
1958	7	2	.27	-	-	-
1959	3	1	.26	-	-	-
1960	8	2	.28	-	-	-
1961	37	12	.33	-	-	-
1962	33	14	.42	-	-	-
1963	6	3	.47	-	-	-
<u>3. United States</u>						
1953	32	12	.37	-	-	-
1954	50	17	.34	-	-	-
1955	73	25	.34	-	-	-
1956	34	11	.33	-	-	-
1957	43	14	.32	-	-	-
1958	49	15	.31	-	-	-
1959	22	7	.29	-	-	-
1960	30	9	.29	-	-	-
1961	11	4	.35	-	-	-
1962	21	8	.39	*	48	15.0
1963	17	7	.43	-	-	-

Table 60
(Cont'd)

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	oz.	\$	Value	Value	Collected	p.c. of
	(000)	(000)	\$/oz.	\$	\$	Dutiable
				(000)		Value
<u>4. Germany, Fed. Rep. of</u>						
1953	5	2	.31	-	-	-
1954	10	3	.30	-	-	-
1955	15	5	.32	-	-	-
1956	5	2	.40	-	-	-
1957	16	4	.27	-	-	-
1958	19	7	.34	-	-	-
1959	16	5	.33	-	-	-
1960	8	2	.28	-	-	-
1961	-	-	-	-	-	-
1962	5	4	.75	-	-	-
1963	48	21	.44	-	-	-
<u>5. Netherlands</u>						
1953	6	2	.37	-	-	-
1954	16	5	.33	-	-	-
1955	10	3	.27	-	-	-
1956	10	4	.35	-	-	-
1957	1	1	.54	-	-	-
1958	4	1	.28	-	-	-
1959	10	2	.21	-	-	-
1960	17	4	.22	-	-	-
1961	9	3	.30	-	-	-
1962	7	2	.32	-	-	-
1963	18	8	.46	2	302	15.0

(a) Beginning in 1964 included in s.c. 879-99

Table 61

Imports: Theobromine, crude, and dimethyl sulphate, s.c. 8412^(a)

Tariff Items 208w1 and 208w3

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>
	lb.	\$	\$/lb.
	(000)	(000)	
<u>1. Total</u>			
1953	60	97	1.60
1954	69	102	1.49
1955-62	-	-	-
1963	2	*	.17
<u>2. United Kingdom</u>			
1953	34	48	1.41
1954	20	25	1.22
1955-63	-	-	-
<u>3. United States</u>			
1953	26	48	1.83
1954	48	77	1.59
1955-63	-	-	-
<u>4. Germany, Fed. Rep. of</u>			
1953-62	-	-	-
1963	2	*	.17

(a) Beginning in 1964 included in s.c. 879-99

Imports: Penicillin and products, s.c. 8083^(a)

Tariff Items 208t, 220(i), 220(ii) and 711

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	1,345	1,344	270,983	20.2
1954	1,137	1,136	225,855	19.9
1955	695	695	137,210	19.8
1956	862	857	169,671	19.8
1957	833	831	164,888	19.8
1958	754	751	146,726	19.5
1959	1,070	1,067	206,643	19.4
1960	1,204	1,195	231,533	19.4
1961	1,406	1,402	275,465	19.7
1962	1,427	1,413	279,828	19.8
1963	1,682	1,571	297,360	18.9
1964	1,173	1,025	197,116	19.2
<u>2. United Kingdom</u>				
1953	32	32	4,923	15.6
1954	30	30	4,637	15.6
1955	19	19	3,010	15.5
1956	31	31	4,721	15.4
1957	25	25	3,775	15.3
1958	62	60	9,276	15.5
1959	87	86	13,415	15.5
1960	59	54	8,285	15.4
1961	104	104	15,916	15.3
1962	261	256	42,234	16.5
1963	478	471	74,759	15.9
1964	188	184	28,090	15.3
<u>3. United States</u>				
1953	1,314	1,313	266,060	20.3
1954	1,107	1,106	221,218	20.0
1955	676	675	134,200	19.9
1956	787	783	156,127	20.0
1957	732	731	145,873	20.0
1958	647	645	128,304	20.0
1959	873	871	171,353	19.7
1960	1,045	1,041	203,663	19.6
1961	1,147	1,142	228,860	20.0
1962	1,134	1,125	231,249	20.6
1963	1,165	1,063	215,030	20.2
1964	893	750	150,116	20.0

(a) Beginning in 1964 renumbered as s.c. 872-23, "Penicillin for human use"; also included in s.c. 878-14, "Veterinary antibiotics preparations"

Table 63

Imports: Streptomycin and products, s.c. 8084^(a)

Tariff Items 208t, 220(i), 220(ii) and 711

Year	Total Imports		Unit Value	Dutiable Value	Duty Collected	Duty as p.c. of Dutiable Value
	kg.	\$	\$/kg.	\$	\$	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	..	285	..	285	55,419	19.4
1954	..	252	..	251	44,007	17.5
1955	..	194	..	193	32,376	16.8
1956	..	220	..	219	37,693	17.2
1957	..	135	..	133	24,369	18.3
1958	..	174	..	173	31,736	18.3
1959	..	299	..	298	57,679	19.3
1960	..	249	..	243	45,064	18.6
1961	..	387	..	341	56,782	16.7
1962	..	422	..	373	65,237	17.5
1963	..	524	..	346	56,820	16.4
1964	13	320	24.77	207	31,511	15.2
<u>2. United Kingdom</u>						
1953	..	23	..	23	3,515	15.1
1954	..	37	..	37	5,595	15.1
1955	..	50	..	50	7,556	15.1
1956	..	18	..	18	2,773	15.1
1957	..	6	..	6	956	15.1
1958	..	35	..	35	5,382	15.6
1959	..	35	..	35	5,380	15.6
1960	..	48	..	45	6,994	15.7
1961	..	78	..	35	5,564	15.7
1962	..	77	..	31	4,872	15.8
1963	..	234	..	61	9,871	16.3
1964	3	127	36.27	14	2,254	15.7
<u>3. United States</u>						
1953	..	262	..	262	51,904	19.8
1954	..	215	..	214	38,412	17.9
1955	..	144	..	143	24,820	17.4
1956	..	201	..	201	34,848	17.4
1957	..	128	..	127	23,413	18.5
1958	..	139	..	139	26,354	19.0
1959	..	260	..	260	51,440	19.8
1960	..	180	..	177	34,326	19.4
1961	..	276	..	272	46,079	16.9
1962	..	299	..	297	52,287	17.6
1963	..	233	..	229	37,200	16.3
1964	8	176	20.84	175	26,584	15.2

(a) Beginning in 1964 renumbered as s.c. 872-51, "Streptomycin and dihydrostreptomycin for human use"; also included in s.c. 878-14, "Veterinary antibiotic preparations"

Table 64

Imports: Paris green, dry, s.c. 8190^(a)

Tariff Item 250

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	Duty as p.c. of Dutiable
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	Value
				(000)		
<u>1. Total</u>						
1953	3	1	.35	1	87	7.5
1954	93	19	.21	16	1,169	7.5
1955	49	11	.23	11	839	7.5
1956	6	2	.32	2	139	7.5
1957	58	15	.26	6	455	7.5
1958	3	1	.37	1	84	7.5
1959	63	15	.24	15	1,114	7.5
1960	6	2	.33	2	148	7.5
1961	32	9	.29	9	692	7.5
1962	2	1	.36	1	60	7.5
1963	15	4	.30	3	261	7.5
<u>2. United States</u>						
1953	3	1	.35	1	87	7.5
1954	93	19	.21	16	1,169	7.5
1955	49	11	.23	11	839	7.5
1956	6	2	.32	2	139	7.5
1957	58	15	.26	6	455	7.5
1958	3	1	.37	1	84	7.5
1959	63	15	.24	15	1,114	7.5
1960	6	2	.33	2	148	7.5
1961	32	9	.29	9	692	7.5
1962	2	1	.36	1	60	7.5
1963	15	4	.30	3	261	7.5

(a) Beginning in 1964 included in s.c. 418-40

Table 65

Imports: Adipic, abietic, maleic and succinic acids, hexamethylene diammonium adipate, hexamethylene diammonium sebecate, caprolactam, ethylene glycol, and hexamethylene diamine, for the manufacture of synthetic resins, s.c. 8410^(a)

Tariff Item 923

Year	Total Imports		Unit Value	Dutiable Value	Duty Collected	Duty as p.c. of Dutiable Value
	lb. (000)	\$ (000)	\$/lb.	\$ (000)	\$	
<u>1. Total</u>						
1953	18,036	10,894	.60	-	-	-
1954	2,900	480	.17	-	-	-
1955	6,342	1,368	.22	4	406	10.0
1956	1,095	373	.34	-	-	-
1957	829	209	.25	-	-	-
1958	1,218	332	.27	-	-	-
1959	1,950	644	.33	-	-	-
1960	4,519	1,895	.42	-	-	-
1961	6,317	3,122	.49	1	220	20.0
1962	6,510	2,317	.36	1	226	20.0
1963	14,901	5,223	.35	3	408	15.1
<u>2. United States</u>						
1953	16,470	10,660	.65	-	-	-
1954	577	142	.25	-	-	-
1955	3,946	920	.23	-	-	-
1956	1,046	356	.34	-	-	-
1957	825	207	.25	-	-	-
1958	1,125	307	.27	-	-	-
1959	1,665	568	.34	-	-	-
1960	4,143	1,801	.43	-	-	-
1961	6,179	3,090	.50	1	220	20.0
1962	5,423	2,059	.38	1	226	20.0
1963	14,879	5,218	.35	3	408	15.1
<u>3. Italy</u>						
1953	718	94	.13	-	-	-
1954	1,489	208	.14	-	-	-
1955	2,007	351	.17	-	-	-
1956-63	-	-	-	-	-	-

(a) Prior to 1956 included s.c. 8416 -- "Phthalic anhydride"; beginning in 1964 included in s.c. 399-10, 409-99 and 411-29

Table 66

Imports: Materials, not mentioned elsewhere, for the manufacture of synthetic resin, cellulose nitrate and pyroxylin plastic, s.c. 8422(a)

Tariff Item 921

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	3,224	-	-	-
1954	4,029	-	-	-
1955	6,145	-	-	-
1956	8,559	-	-	-
1957	9,559	-	-	-
1958	10,243	-	-	-
1959	13,406	-	-	-
1960	18,098	-	-	-
1961	18,680	-	-	-
1962	21,225	123	7,725	6.3
1963	21,693	56	6,359	11.4
<u>2. United Kingdom</u>				
1953	9	-	-	-
1954	29	-	-	-
1955	53	-	-	-
1956	17	-	-	-
1957	18	-	-	-
1958	90	-	-	-
1959	84	-	-	-
1960	88	-	-	-
1961	70	-	-	-
1962	130	-	-	-
1963	304	1	224	15.0

Table 66
(Cont'd)

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>3. United States</u>				
1953	3,148	-	-	-
1954	3,890	-	-	-
1955	5,930	-	-	-
1956	8,248	-	-	-
1957	9,325	-	-	-
1958	9,932	-	-	-
1959	13,080	-	-	-
1960	17,741	-	-	-
1961	18,203	-	-	-
1962	20,571	97	5,368	5.5
1963	20,814	49	5,610	11.5

(a) Beginning in 1964 included in various statistical classes

Table 67

Imports: Dye intermediates, n.o.p., s.c. 8900^(a)

Tariff Items 203, 203a, 203e and 203f

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1962	1,919	1,033	.54	21	3,883	18.2
1963	2,684	1,218	.45	45	8,359	18.6
<u>2. United Kingdom</u>						
1962	225	112	.50	1	256	20.0
1963	242	108	.45	-	-	-
<u>3. United States</u>						
1962	1,019	569	.56	14	2,600	18.3
1963	1,589	721	.45	34	6,453	19.2
<u>4. Germany, Fed. Rep. of</u>						
1962	606	308	.51	3	626	19.7
1963	750	323	.43	-	-	-

(a) Prior to 1962 included in s.c. 8094, 8095 and 8104; beginning in 1964 included in s.c. 426-99 and 429-82

Imports: Organic acids, their anhydrides, halides, peroxides and
peracids n.e.s., s.c. 409-99(a)

Tariff Items various

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u> <u>Value</u>	<u>Dutiable</u> <u>Value</u>	<u>Duty</u> <u>Collected</u>	<u>Duty as</u> <u>p.c. of</u> <u>Dutiable</u> <u>Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	48,132	11,221	.23	2,323	382,808	16.5
<u>2. United Kingdom</u>						
1964	6,799	1,774	.26	150	23,782	15.8
<u>3. United States</u>						
1964	38,369	8,585	.22	1,928	318,212	16.5

(a) Prior to 1964 included in various statistical classes

Table 69

Imports: Nitrogen-function compounds n.e.s., s.c. 411-99^(a)

Tariff Items 203, 208h, 208t, 208y, 216, 711, 791 and 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
	<u>1. Total</u>					
1964	18,777	9,848	.52	6,004	909,360	15.1
	<u>2. United Kingdom</u>					
1964	3,145	2,108	.67	610	91,475	15.0
	<u>3. United States</u>					
1964	14,156	6,533	.46	4,576	691,779	15.1

(a) Prior to 1964 included in s.c. 8022, 8069, 8073, 8264, 8415 and 8422

Table 70

Imports: Organo-inorganic and heterocyclic compounds (including inorganic esters) n.e.s., s.c. 412-99^(a)

Tariff Items 208t, 208w3, 216e, 263, 263e, 269(ii), 711 and 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
	<u>1. Total</u>					
1964	19,860	12,720	.64	8,741	959,752	11.0
	<u>2. United Kingdom</u>					
1964	601	843	1.40	28	4,153	15.0
	<u>3. United States</u>					
1964	18,075	9,874	.55	7,020	689,888	9.8
	<u>4. Switzerland</u>					
1964	28	1,066	37.52	1,063	159,641	15.0

(a) Prior to 1964 included in s.c. 7185, 8022, 8412, 8415 and 8422

Table 71

Imports: Organic chemicals n.e.s., s.c. 413-99^(a)

Tariff Items 208t, 219a(2), 220e, 239, 269(i), 269(ii), 269b and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	8,262	1,512	.18	333	42,186	12.7
<u>2. United Kingdom</u>						
1964	617	170	.28	*	37	14.9
<u>3. United States</u>						
1964	3,999	1,112	.28	333	42,149	12.6
<u>4. Italy</u>						
1964	3,616	210	.06	-	-	-

(a) Prior to 1964 included in s.c. 1583, 7185, 8073, 8183, 8319 and 8415

Table 72

Imports: Antibiotic and vitamin feed supplements, s.c. 878-89^(a)

Tariff Items 208t, 219f, 220a(i) and 711

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1964	1,735	1,200	227,779	19.0
<u>2. United Kingdom</u>				
1964	1	1	103	15.6
<u>3. United States</u>				
1964	1,236	854	158,784	18.6
<u>4. Switzerland</u>				
1964	387	311	62,104	20.0

^(a) Prior to 1964 included in s.c. 8086, 8415 and 8432

Table 73

Imports: Barbiturates and amphetamines, s.c. 879-60^(a)

Tariff Items 208t, 220(i) and 711

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1964	435	325	55,505	17.1
<u>2. United Kingdom</u>				
1964	115	5	713	15.2
<u>3. United States</u>				
1964	240	240	41,237	17.2

^(a) Prior to 1964 included in s.c. 8074, 8366 and 8415

Table 74

Imports: Narcotics, s.c. 879-30^(a)

Tariff Items 208t, 221, 222 and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>oz.</u>	<u>\$</u>	<u>\$/oz.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
	<u>1. Total</u>					
1964	245	1,122	4.57	186	30,501	16.4
	<u>2. United Kingdom</u>					
1964	202	936	4.64	*	24	15.1
	<u>3. United States</u>					
1964	24	89	3.69	89	15,845	17.9

(a) Prior to 1964 included in s.c. 8053, 8054, 8056 and 8415

Table 75

Imports: Sulfonamides and their salts, s.c. 879-50^(a)

Tariff Items 208t, 220(i), ex 220(i), 220(ii), 711 and 857

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1964	1,234	947	151,393	16.0
<u>2. United Kingdom</u>				
1964	214	19	2,806	15.0
<u>3. United States</u>				
1964	442	395	65,351	16.6
<u>4. Switzerland</u>				
1964	316	316	49,557	15.7

^(a) Prior to 1964 included in s.c. 8085 and 8415

Table 76

Imports: Acids, other, n.o.p., s.c., 8022^(a)

Tariff Items 216, ex. 216, 269(i), 269(ii), 711 and 851

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	2,567	874	.34	626	97,189	15.5
1954	3,589	1,019	.28	752	114,417	15.2
1955	5,789	1,430	.25	1,027	156,925	15.3
1956	9,566	2,187	.23	1,367	215,646	15.8
1957	9,751	2,167	.22	1,388	212,078	15.3
1958	10,987	2,230	.20	1,419	200,184	14.1
1959	11,907	2,531	.21	1,268	177,202	14.0
1960	11,195	2,531	.23	1,219	170,804	14.0
1961	13,023	2,742	.21	1,095	150,791	13.8
1962	13,837	3,039	.22	1,435	210,781	14.7
1963	15,624	3,252	.21	1,430	209,369	14.6
<u>2. United Kingdom</u>						
1953	372	110	.30	2	344	15.0
1954	407	128	.31	9	1,358	15.0
1955	736	183	.25	9	1,370	15.0
1956	1,264	397	.31	48	7,192	15.0
1957	1,016	256	.25	26	3,891	15.0
1958	1,063	254	.24	60	8,003	13.3
1959	1,347	326	.24	27	3,736	13.6
1960	847	240	.28	47	5,573	11.9
1961	1,280	327	.26	84	10,116	12.0
1962	899	248	.28	81	10,707	13.2
1963	311	155	.50	9	1,393	15.2

Table 76
(Cont'd)

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	lb.	\$	Value	Value	Collected	p.c. of
	(000)	(000)	\$/lb.	\$	\$	Dutiable
				(000)		Value
<u>3. United States</u>						
1953	1,880	668	.36	575	89,228	15.5
1954	2,715	745	.27	665	101,172	15.2
1955	4,406	1,088	.25	956	146,270	15.3
1956	6,705	1,471	.22	1,260	199,136	15.8
1957	7,395	1,670	.23	1,323	202,123	15.3
1958	7,125	1,520	.21	1,119	168,095	15.0
1959	7,222	1,554	.22	926	139,298	15.0
1960	6,314	1,472	.23	899	128,164	14.3
1961	7,578	1,699	.22	745	111,896	15.0
1962	7,501	1,804	.24	1,042	158,003	15.2
1963	8,309	1,986	.24	997	156,234	15.7

4. Germany, Fed. Rep. of

1953	213	57	.27	31	4,669	15.0
1954	447	131	.29	66	9,952	15.0
1955	574	113	.20	48	7,127	15.0
1956	1,311	257	.20	40	5,962	15.0
1957	1,204	196	.16	11	1,726	16.3
1958	1,854	284	.15	68	10,729	15.9
1959	2,030	415	.20	134	20,511	15.4
1960	3,019	585	.19	136	20,693	15.3
1961	2,003	353	.18	59	8,860	15.1
1962	2,569	448	.17	45	6,849	15.4
1963	2,207	395	.18	67	10,166	15.2

(a) Beginning in 1956 includes s.c. 8013; beginning in 1964 included in various statistical classes

Imports: Other chemicals and allied products, n.o.p., s.c. 8415^(a)

Tariff Items: various

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	37,909	30,315	5,389,565	17.8
1954	40,742	32,927	5,711,136	17.3
1955	50,986	36,592	6,182,693	16.9
1956	58,146	39,527	6,628,555	16.8
1957	64,766	43,342	7,213,631	16.6
1958	65,293	48,871	7,958,062	16.3
1959	80,376	59,047	9,685,802	16.4
1960	78,401	57,728	9,378,761	16.2
1961	86,180	62,588	10,079,151	16.1
1962	87,910	64,720	10,264,932	15.9
1963	94,415	67,223	10,525,625	15.7

2. United Kingdom

1953	3,156	980	105,758	10.8
1954	3,013	661	99,567	15.1
1955	4,736	1,226	184,263	15.0
1956	4,797	1,167	175,022	15.0
1957	4,745	1,397	209,376	15.0
1958	5,166	1,252	187,277	15.0
1959	5,460	1,256	188,808	15.0
1960	5,590	1,272	190,477	15.0
1961	7,581	1,519	226,098	14.9
1962	9,940	2,066	324,518	15.7
1963	9,290	1,570	230,620	14.7

3. United States

1953	33,870	28,551	5,155,929	18.1
1954	36,412	31,096	5,423,404	17.4
1955	44,215	33,620	5,719,545	17.0
1956	51,002	36,424	6,138,859	16.9
1957	57,217	39,383	6,587,643	16.7
1958	56,783	44,616	7,278,319	16.3
1959	71,039	54,322	8,931,578	16.4
1960	67,482	51,851	8,435,308	16.3
1961	72,195	55,307	8,884,338	16.1
1962	71,496	56,711	8,901,524	15.7
1963	77,086	58,431	9,105,263	15.6

(a) Beginning in 1958 includes former classes 8273, 8295, and 8409; beginning in 1964 included in various statistical classes

Table 78

Imports: Products of petroleum, n.o.p., s.c. 7185^(a)

Tariff Items 269(i), 269(ii), 269b, 269c, 272c and 851

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	gal.	\$	Value	Value	Collected	p.c. of
	(000)	(000)	\$/gal.	\$	\$	Dutiable
				(000)		Value
<u>1. Total</u>						
1953	14,571	3,633	.25	1,785	68,480	3.8
1954	11,232	3,526	.31	1,583	58,596	3.7
1955	14,297	3,711	.26	1,497	25,370	1.7
1956	17,793	4,785	.27	1,844	30,374	1.6
1957	18,759	5,215	.28	1,514	25,290	1.7
1958	22,412	4,270	.19	1,614	59,345	3.7
1959	25,063	4,605	.18	2,907	113,484	3.9
1960	32,349	5,502	.17	3,739	169,071	4.5
1961	35,713	6,503	.18	4,106	161,697	3.9
1962	34,732	6,186	.18	3,580	126,609	3.5
1963	34,412	6,177	.18	3,465	127,366	3.7

2. United Kingdom

1953	25	10	.40	10	83	0.8
1954	*	2	7.13	*	1	0.4
1955	*	2	7.21	*	1	0.4
1956	*	*	1.30	-	-	-
1957	143	171	1.20	1	4	0.7
1958	1	*	.43	*	1	0.5
1959	6	3	.53	3	22	0.7
1960	*	1	2.84	*	-	-
1961	8	4	.53	4	29	0.7
1962	9	6	.74	6	60	10.0
1963	1	2	1.18	2	13	0.7

3. United States

1953	10,613	3,273	.31	1,426	55,288	3.9
1954	11,232	3,524	.31	1,583	58,595	3.7
1955	13,462	3,484	.26	1,272	22,587	1.8
1956	16,233	4,341	.27	1,400	25,174	1.8
1957	18,361	4,953	.27	1,423	24,434	1.7
1958	22,411	4,270	.19	1,614	59,344	3.7
1959	25,056	4,602	.18	2,904	113,463	3.9
1960	32,349	5,501	.17	3,739	169,071	4.5
1961	35,428	6,464	.18	4,067	158,904	3.9
1962	34,521	6,076	.18	3,573	126,549	3.5
1963	33,340	5,761	.17	3,368	122,894	3.6

(a) Beginning in 1964 included in various statistical classes

Table 1

Exports: Vinegar, s.c. 770^(a)

<u>Year</u>	<u>Quantity</u> gal.	<u>Value</u> \$	<u>Unit</u> <u>Value</u> \$/gal.
1953	42,793	20,893	.49
1954	44,975	25,105	.56
1955	56,414	28,566	.51
1956	36,621	20,578	.56
1957	32,329	20,703	.64
1958	43,007	22,535	.52
1959	40,979	21,374	.52
1960	49,917	27,612	.55
1961	36,870	25,518	.69
1962	49,713	29,068	.58
1963	73,057	39,816	.54
1964	56,133	54,215	.97
1965	70,406	65,796	.93

(a) Beginning in 1961 renumbered as s.c. 110-79; beginning in 1964 renumbered as s.c. 117-49

Table 2

Exports: Vitamins and preparations, pharmaceutical grade, s.c.
870-49^(a)

<u>Year</u>	<u>Value</u> \$
1961	1,215,191
1962	1,155,985
1963	1,309,364
1964	1,882,620
1965	1,013,038

(a) Not available prior to 1961

Table 3

Exports: Narcotics, s.c. 870-39^(a)

<u>Year</u>	<u>Value</u> \$
1961	1,427
1962	11,620
1963	-
1964	110
1965	-

(a) Not available prior to 1961

Table 4

Exports: Penicillin and products, s.c. 8103^(a)

<u>Year</u>	<u>Quantity</u> bill units	<u>Value</u> \$	Unit <u>Value</u> \$/bill unit
1953	..	1,027,204	..
1954	8,301	742,554	92.46
1955	9,025	428,905	47.52
1956	4,375	164,215	37.53
1957	3,368	157,647	46.81
1958	152	7,173	47.19
1959	301	13,318	44.25
1960	513	16,242	31.66
1961	1,205	122,476	101.64
1962	1,254	162,011	129.20
1963	2,893	256,595	88.70
1964	..	212,452	..
1965	..	171,000	..

(a) Beginning in 1961 renumbered as s.c. 870-23, "Penicillin for human use"

Table 5

Exports: Streptomycin and products, s.c. 8105^(a)

<u>Year</u>	<u>Quantity</u> kgm.	<u>Value</u> \$	<u>Unit</u> <u>Value</u> \$/kgm.
1953	..	806,977	..
1954	4,237	562,586	132.78
1955	7,518	558,835	74.33
1956	3,623	211,741	58.44
1957	5,848	410.121	70.13
1958	1,446	92,610	64.05
1959	-	-	-
1960	1	108	108.00
1961	9	1,435	159.44
1962	204	20,307	99.54
1963	336	40,926	121.80
1964	1,708	17,119	10.02
1965	-	-	-

(a) Beginning in 1961 renumbered as s.c. 870-25, "Streptomycin and dihydrostreptomycin for human use"

Table 6

Exports: Antibiotics, n.o.p., s.c. 8108^(a)

<u>Year</u>	<u>Value</u> \$
1954	537,587
1955	331,272
1956	307,822
1957	326,123
1958	195,365
1959	489,755
1960	1,140,028
1961	984,462
1962	1,020,323
1963	685,511
1964	843,955
1965	1,772,598

(a) Not available prior to 1954. Beginning in 1961 renumbered as s.c. 870-29, "Antibiotics for human use, n.e.s.", also included in s.c. 870-19 and 870-89

Table 7

Exports: Organic acids, anhydrides, halides, peroxides, peracids and derivatives, s.c. 414-49^(a)

<u>Year</u>	<u>Quantity</u> cwt.	<u>Value</u> \$	<u>Unit</u> <u>Value</u> \$/cwt.
1961	798,714	9,619,589	12.04
1962	556,411	6,335,176	11.39
1963	494,536	5,291,037	10.70
1964	606,800	6,703,299	11.05
1965	1,007,734	12,137,065	12.04

(a) Not available prior to 1961

Table 8

Exports: Nitrogen-function compounds n.e.s., s.c. 414-59^(a)

<u>Year</u>	<u>Quantity</u> cwt.	<u>Value</u> \$	<u>Unit</u> <u>Value</u> \$/cwt.
1961	896,411	9,506,857	10.61
1962	1,047,349	11,540,141	11.02
1963	1,014,643	10,884,698	10.73
1964	930,878	9,856,085	10.59
1965	1,032,271	10,859,985	10.52

(a) Not available prior to 1961

Table 9

Exports: Organo-inorganic compounds and heterocyclic compounds, including inorganic esters, s.c. 414-79^(a)

<u>Year</u>	<u>Quantity</u> cwt.	<u>Value</u> \$	<u>Unit</u> <u>Value</u> \$/cwt.
1961	6,011	444,230	73.90
1962	8,669	750,974	86.63
1963	15,330	856,688	55.88
1964	8,491	603,558	71.08
1965	10,441	683,996	65.51

(a) Not available prior to 1961

Table 10

Exports: Organic chemicals n.e.s., s.c. 414-99^(a)

<u>Year</u>	<u>Quantity</u> cwt.	<u>Value</u> \$	<u>Unit</u> <u>Value</u> \$/cwt.
1961	28,272	250,998	8.88
1962	69,312	620,688	8.95
1963	83,085	594,333	7.15
1964	59,868	492,399	8.22
1965	44,843	332,202	7.41

^(a) Not available prior to 1961

Table 11

Exports: Drugs and chemicals, n.o.p., s.c. 8490^(a)

<u>Year</u>	<u>Value</u> \$
1953	64,705,803
1954	70,109,680
1955	75,187,943
1956	82,609,866
1957	90,880,581
1958	97,448,312
1959	92,583,210
1960	47,618,103

^(a) Prior to 1959 includes s.c. 8475; prior to 1960 includes s.c. 8471 and 8481; beginning in 1961 included in various statistical classes

APPENDIX IIPrincipal Relevant Recommended Items

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
R-10	208t - Drugs, n.o.p., of a kind not produced in Canada	Free	15	25
R-11	208u - Sulpho-thio-phosphoric (dithio-phosphoric) compounds for use in the process of concentrating ores, metals or minerals	Free	Free	10
R-15	213 - Vinegar	10	15	25
R-40	Hexamethylenetetramine or metaldehyde put up in tablets, sticks or similar forms for use as fuels:			
	(1) Hexamethylenetetramine	10	15	25
	(2) Metaldehyde	Free	15	25
15.10	Industrial mixtures, including reaction blends, of fatty acids not containing 90 per cent or more by weight of any one acid; acid oils from refining, n.o.p.; industrial mixtures, including reaction blends, of fatty alcohols not containing 90 per cent or more by weight of any one alcohol:			
	(1) Acid oils	Free	10	25
	(2) Fatty acids except tall oil fatty acids	10	15	25
	(3) Fatty alcohols	Free	Free	Free
	(4) Tall oil fatty acids	Free	Free	Free
29.13	Ketones, ketone-alcohols, ketone-phenols, ketone-aldehydes, quinones, quinone-alcohols, quinone-phenols, quinone-aldehydes and other single or complex oxygen-function ketones and quinones, and their halogenated, sulphonated, nitrated or nitrosated derivatives:			
	(1) Other than the following	Free	15	25
	(2) Acetone	10	15	25
	(3) Camphor, natural or synthetic	Free	5	25
	(4) Diacetone alcohol	10	15	25
	(5) 3,6a-Dihydroxypregnan-20-one	10	15	25
	(6) Essential oils, natural or synthetic, of this item	Free	7½	7½
	(7) Ethylmethyl ketone	10	15	25
	(8) 12a-Hydroxypregnan-3, 20-dione	10	15	25

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
29.13	(9) Isophorone	10	15	25
(Cont'd)	(10) Menadione sodium bisulphite	10	15	25
	(11) Mesityl oxide	10	15	25
	(12) Methylisobutyl ketone	10	15	25
	(13) 5B-Pregnan-3a-ol-20-one	10	15	25
	(14) 11-Pregnen-3, 20-dione	10	15	25
29.14	Monoacids and their anhydrides, acid halides, acid peroxides and peracids, and their halogenated, sulphonated, nitrated or nitrosated derivatives:			
	(1) Other than the following	Free	15	25
	(2) Acetic acid including aqueous solutions of any strength but not including vinegar	10	15	25
	(3) Acetic anhydride	10	15	25
	(4) 12a-Acetoxypregnan-3, 20-dione	10	15	25
	(5) Acrylic acid	Free	Free	10
	(6) Aluminum distearate	10	15	25
	(7) Aluminum monostearate	10	15	25
	(8) Aluminum octoate (aluminum-2-ethylhexanoate)	10	15	25
	(9) Aluminum tristearate	10	15	25
	(10) Ammonium acetate	10	15	25
	(11) Ammonium palmitate	15	20	32½
	(12) Barium stearate	10	15	25
	(13) Benzoic acid	10	15	25
	(14) Benzoyl peroxide	10	15	25
	(15) n-Butyl acetate	10	15	25
	(16) Butyl oleates	10	15	25
	(17) tert-Butyl perbenzoate	10	15	25
	(18) Butyl stearates	10	15	25
	(19) Calcium linoleate	10	15	25
	(20) Calcium propionate	10	15	25
	(21) Calcium stearate	10	15	25
	(22) Deleted			
	(23) Cobalt linoleate	10	15	25
	(24) Copper acetate, basic (verdigris)	Free	Free	Free
	(25) 3a, 12a-Diacetoxypregnan-20-one	10	15	25
	(26) Diglycol laurate (diethylene glycol monolaurate)	10	15	25
	(27) Diglycol oleate (diethylene glycol mono-oleate)	10	15	25
	(28) Diglycol stearate (diethylene glycol monostearate)	10	15	25
	(29) Di-iodo stearic acid	10	15	25
	(30) Essential oils, natural and synthetic, of this item	Free	7½	7½
	(31) Ethyl acetate	10	15	25
	(32) Ethyl acrylate	Free	Free	10
	(33) Formic acid	Free	12½	25
	(34) Glycerol mono-oleate	10	15	25
	(35) Glycerol monostearate	10	15	25
	(36) Glycerol triacetate	10	15	25

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
29.14	(37) Isopropyl acetate	10	15	25
(Cont'd)	(38) Isopropyl oleate	10	15	25
	(39) Lauroyl peroxide	10	15	25
	(40) Lead acetate, neutral	Free	10	25
	(41) Lead formate	10	15	25
	(42) Lead linoleate	10	15	25
	(43) Lead stearate	10	15	25
	(44) Lead stearate, dibasic	10	15	25
	(45) Lithium stearate	10	15	25
	(46) Magnesium stearate	10	15	25
	(47) Manganese linoleate	10	15	25
	(48) Methacrylic acid	Free	Free	10
	(49) Methyl acrylate	Free	Free	10
	(50) Methylamyl acetate	10	15	25
	(51) Oleic acid	10	15	25
	(52) Potassium acetate	10	15	25
	(53) Potassium palmitate	15	20	32½
	(54) n-Propylacetate	10	15	25
	(55) n-Propylolate	10	15	25
	(56) Pyroligneous acid, crude	10	15	25
	(57) Sodium acetate	10	15	25
	(58) Sodium benzoate	10	15	25
	(59) Sodium palmitate	15	20	32½
	(60) Sodium propionate	10	15	25
	(61) Sodium stearate	15	20	32½
	(62) Stannous octoate (stannous-2-ethylhexanoate)	10	15	25
	(63) Vinyl acetate	10	15	25
	(64) Zinc laurate	10	15	25
	(65) Zinc stearate	10	15	25
29.15	Polyacids and their anhydrides, acid halides, acid peroxides and peracids, and their halogenated, sulphonated, nitrated or nitrosated derivatives:			
	(1) Other than the following	Free	15	25
	(2) Adipic acid	10	15	25
	(3) Butyl-2-ethylhexyl phthalate (Butyl octyl phthalate)	10	15	25
	(4) Butylisodecyl phthalate	10	15	25
	(5) Butyliso-octyl phthalate	10	15	25
	(6) Dibutyl fumarates	10	15	25
	(7) Dibutyl maleates	10	15	25
	(8) Dibutyl phthalates	10	15	25
	(9) Dibutyl sebacates	10	15	25
	(10) Dicapryl phthalate (di-(2-octyl) phthalate)	10	15	25
	(11) Dicyclohexyl phthalate	10	15	25
	(12) Didecyl phthalate	10	15	25
	(13) Di-2-ethylbutyl phthalate	10	15	25
	(14) Di(2-ethylhexyl)adipate	10	15	25
	(15) Di(2-ethylhexyl)azelate (dioctyl azelate)	10	15	25
	(16) Di(2-ethylhexyl)phthalate	10	15	25

Goods Subject to Duty and Free Goods

		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
29.15	(17) Di(2-ethylhexyl)sebacate	10	15	25
(Cont'd)	(18) Di-isodecyl adipate	10	15	25
	(19) Di-isodecyl phthalate	10	15	25
	(20) Di-iso-octyl adipate	10	15	25
	(21) Di-iso-octyl azelate	10	15	25
	(22) Di-iso-octyl phthalate	10	15	25
	(23) Di(2-methoxyethyl)phthalate	10	15	25
	(24) Dimethylcyclohexyl phthalate	10	15	25
	(25) Dimethyl terephthalate	Free	Free	10
	(26) Ditridecyl phthalate	10	15	25
	(27) 2-Ethylhexyl-n-decyl phthalate	10	15	25
	(28) Ferrous fumarate	10	15	25
	(29) Fumaric acid	10	15	25
	(30) Lead phthalate, dibasic	10	15	25
	(31) Maleic acid	10	15	25
	(32) Maleic anhydride	10	15	25
	(33) n-Octyl n-decyl adipate	10	15	25
	(34) n-Octyl n-decyl phthalate	10	15	25
	(35) Oxalic acid	10	15	25
	(36) Phthalic acid	10	15	25
	(37) Phthalic anhydride	10	15	25
29.16	Alcohol-acids, aldehyde-acids, ketone-acids, phenol-acids and other single or complex oxygen-function acids, and their anhydrides, acid halides, acid peroxides and peracids, and their halogenated, sulphonated, nitrated or nitrosated derivatives:			
	(1) Other than the following	Free	15	25
	(2) Antimony lactate	Free	Free	Free
	(3) Antimony potassium tartrate	Free	Free	Free
	(4) Bismuth gallate	10	15	25
	(5) Bismuth gallate, basic	10	15	25
	(6) Bismuth salicylate	10	15	25
	(7) Bismuth salicylate, basic	10	15	25
	(8) Cholic acid	10	15	25
	(9) Citric acid	10	15	25
	(10) Dehydrocholic acid	10	15	25
	(11) Desoxycholic acid	10	15	25
	(12) Diacetoneketogulonic acid	Free	Free	25
	(13) 2,4-Dichlorophenoxyacetic acid	10	15	25
	(14) Dioctyl diglycollate	10	15	25
	(15) Essential oils, natural and synthetic, of this Item	Free	7½	7½
	(16) Gallic acid	Free	Free	Free
	(17) 3b-Hydroxy-5-cholenic acid	10	15	25
	(18) 12-Hydroxystearic acid	10	15	25
	(19) Hyocholic acid	10	15	25
	(20) Hyodesoxycholic acid	10	15	25
	(21) 2-Methyl-4-chlorophenoxyacetic acid	10	15	25
	(22) Monocalcium citrate	Free	Free	25
	(23) Potassium bitartrate	Free	10	25
	(24) Potassium citrate (tripotassium citrate)	10	15	25

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
29.16	(25) Potassium tartrate, neutral	10	15	25
(Cont'd)	(26) Propyl gallate	10	15	25
	(27) Sodium citrate (trisodium citrate)	10	15	25
	(28) Sodium dehydrocholate	10	15	25
	(29) Tartaric acid	Free	10	25
	(30) 2,4,5-Trichlorophenoxyacetic acid	10	15	25
29.17	Sulphuric esters and their salts, and their halogenated, sulphonated, nitrated or nitrosated derivatives:			
	(1) Other than the following	Free	15	25
	(2) Cetyl sulphate and the ammonium, lithium, potassium and sodium salts of cetyl hydrogen sulphate	10	15	25
	(3) Decyl sulphate and the ammonium, lithium, potassium and sodium salts of decyl hydrogen sulphate	10	15	25
	(4) Dimethyl sulphate	Free	Free	Free
	(5) Hexyl sulphate and the ammonium, lithium, potassium and sodium salts of hexyl hydrogen sulphate	10	15	25
	(6) Isodecyl sulphate and the ammonium, lithium, potassium and sodium salts of isodecyl hydrogen sulphate	10	15	25
	(7) Iso-octyl sulphate and the ammonium, lithium, potassium and sodium salts of iso-octyl hydrogen sulphate	10	15	25
	(8) Lauryl sulphate and the ammonium, lithium, potassium and sodium salts of lauryl hydrogen sulphate	10	15	25
	(9) Nonyl sulphate and the ammonium, lithium, potassium and sodium salts of nonyl hydrogen sulphate	10	15	25
	(10) Octyl sulphate and the ammonium, lithium, potassium and sodium salts of octyl hydrogen sulphate	10	15	25
	(11) Oleyl sulphate and the ammonium, lithium, potassium and sodium salts of oleyl hydrogen sulphate	10	15	25
	(12) Stearyl sulphate and the ammonium, lithium, potassium and sodium salts of stearyl hydrogen sulphate	10	15	25
	(13) Tridecyl sulphate and the ammonium, lithium, potassium and sodium salts of tridecyl hydrogen sulphate	10	15	25
29.18	Nitrous and nitric esters, and their halogenated, sulphonated, nitrated or nitrosated derivatives:			
	(1) Other than the following	Free	15	25
	(2) Essential oils, natural and synthetic, of this item	Free	7½	7½

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
29.18	(3) Ethyl nitrite per gallon	\$3.00	\$3.00	\$3.00
(Cont'd)	and	30	30	30
	(4) Mannitol hexanitrate	10	15	25
	(5) Nitroglycerol (glyceryl trinitrate)	10	15	25
	(6) Nitroglycol	10	15	25
	(7) Pentaerythritol tetranitrate	10	15	25
29.19	Phosphoric esters and their salts, including lactophosphates, and their halogenated, sulphonated, nitrated or nitrosated derivatives:			
	(1) Other than the following	Free	15	25
	(2) Amyl acid phosphates	10	15	25
	(3) n-Butyl acid phosphates	10	15	25
	(4) Dodecyl acid phosphates	10	15	25
	(5) Ethyl acid phosphates	10	15	25
	(6) Heptadecyl acid phosphates	10	15	25
	(7) Hexadecyl acid phosphates	10	15	25
	(8) Isobutyl acid phosphates	10	15	25
	(9) Nonyl acid phosphates	10	15	25
	(10) Octyl acid phosphates	10	15	25
	(11) Propyl acid phosphates	10	15	25
29.20	Carbonic esters and their salts, and their halogenated, sulphonated, nitrated or nitrosated derivatives	Free	15	25
29.21	Other esters of mineral acids (exclud- ing halides) and their salts, and their halogenated, sulphonated, nitrated or nitrosated derivatives	Free	15	25
29.22	Amine-function compounds:			
	(1) Other than the following	Free	15	25
	(2) Aniline	10	15	25
	(3) N-sec-butyl-N'-phenyl-p-phenylene- diamine	10	15	25
	(4) N,N'-di-sec-butyl-p-phenylene- diamine	10	15	25
	(5) 2,4-Dichlorophenoxyacetic acid amine salts	10	15	25
	(6) N,N'-di-isopropyl-p-phenylene- diamine	10	15	25
	(7) N-(1,3-dimethyl butyl)-N'-phenyl- p-phenylenediamine	10	15	25
	(8) Diphenylamine	10	15	25
	(9) N,N'-diphenyl-p-phenylenediamine	10	15	25
	(10) Hexamethylene diamine	10	15	25
	(11) Hexamethylene diammonium adipate	10	15	25
	(12) N-Isopropyl-N'-phenyl-p-phenylene- diamine	10	15	25
	(13) 2-Methyl-4-chlorophenoxyacetic acid amine salts	10	15	25

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
29.22	(14) Methyltrinitrophenylnitramine	10	15	25
(Cont'd)	(15) N-Nitrosodiphenylamine	10	15	25
	(16) Phenyl-b-naphthylamine	10	15	25
	(17) 2,4,5-Trichlorophenoxyacetic acid amine salts	10	15	25
29.23	Single or complex oxygen-function amino-compounds:			
	(1) Other than the following	Free	15	25
	(2) Aluminum glycinate, basic (dihydroxyaluminum aminoacetate)	10	15	25
	(3) Diethylenetriamine-N,N,N',N'',N''- pentacetic acid: the di-basic and tri-basic calcium, iron and potassium salts of	10	15	25
	(4) Ethanolamines	10	15	25
	(5) Ethylenediaminetetra-acetic acid, its sodium salts and its di-basic and tri-basic calcium, iron and potassium salts	10	15	25
	(6) Glutamic acid	10	15	25
	(7) Hydroxyethylethylenediaminetriacetic acid: the di-basic and tri-basic calcium, iron and potassium salts of,	10	15	25
	(8) Deleted			
	(9) Monosodium glutamate	10	15	25
	(10) Pentasodium diethylenetriamine- N,N,N',N'',N''-pentacetate	10	15	25
	(11) Sodium-N,N-di(2-hydroxyethyl) glycine	10	15	25
	(12) Deleted			
	(13) Trisodium hydroxyethylethylene- diamine tri-acetate	10	15	25
29.24	Quaternary ammonium salts and hydrox- ides; lecithins and other phospho- aminolipins:			
	(1) Other than the following	Free	15	25
	(2) Alkylbenzyltrialkylammonium chlorides	10	15	25
	(3) Benzyltrialkylammonium chlorides	10	15	25
29.25	Amide-function compounds:			
	(1) Other than the following	Free	15	25
	(2) Acetaminophen (p-acetamidophenol)	10	15	25
	(3) N,N-Diethyl-m-toluamide	10	15	25
	(4) Lauric diethanolamide	10	15	25
	(5) Lauric isopropanolamide (lauryl isopropanolamide)	10	15	25
	(6) Lauric monoethanolamide	10	15	25
	(7) Meproamate (2-methyl-2-n-propyl- 1,3-propanediol dicarbamate)	10	15	25

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
29.25	(8) Methocarbamol (3(-ortho-methoxy-phenoxy)-1,2-propanediol-1-carbamate)	10	15	25
	(9) N-1-Naphthylphthalamic acid	10	15	25
	(10) Oleic diethanolamide	10	15	25
	(11) Oleic monoethanolamide	10	15	25
	(12) Sodium N-methyl-N-oleoyl taurate	10	15	25
	(13) Stearyl diethanolamide	10	15	25
	(14) Urea containing, in the dry state, more than 45 per cent by weight of nitrogen, whether or not coated or prilled	Free	Free	Free
29.26	Imide-function compounds and imine-function compounds:			
	(1) Other than the following	Free	15	25
	(2) Guanidine nitrate	10	15	25
	(3) Hexamethylenetetramine	10	15	25
	(3A) Methenamine mandelate	10	15	25
	(4) Nitroguanidine	10	15	25
	(5) Trimethylenetrinitramine	10	15	25
29.27	Nitrile-function compounds:			
	(1) Other than the following	Free	15	25
	(2) Acetonitrile	10	15	25
	(3) Acrylonitrile	10	15	25
	(4) Adiponitrile	10	15	25
	(5) Dicyandiamide	10	15	25
29.28	Diazo-, azo- and azoxy-compounds	Free	15	25
29.29	Organic derivatives of hydrazine or of hydroxylamine	Free	15	25
29.30	Compounds with other nitrogen-functions:			
	(1) Other than the following	Free	15	25
	(2) Toluene-di-isocyanates	10	15	25
29.31	Organo-sulphur compounds:			
	(1) Other than the following	Free	15	25
	(2) Diamylammonium diamyl dithiocarbamate	10	15	25
	(3) Disodium ethylene bisdithiocarbamate	10	15	25
	(4) Manganese ethylene bisdithiocarbamate	10	15	25
	(5) Potassium amyl xanthate	10	15	25
	(6) Potassium ethyl xanthate	10	15	25
	(7) Potassium isopropyl xanthate	10	15	25
	(8) Selenium diethyl dithiocarbamate	10	15	25
	(9) Sodium sec-butyl xanthate	10	15	25

Goods Subject to Duty and Free Goods		B.P.	M.F.N.	G.T.
29.31	(10) Sodium diethyl dithiocarbamate	10	15	25
(Cont'd)	(11) Sodium dimethyl dithiocarbamate	10	15	25
	(12) Sodium isopropyl xanthate	10	15	25
	(13) Tetramethylthiuram disulphide	10	15	25
	(14) Tetramethylthiuram monosulphide	10	15	25
	(15) Zinc dibutyl dithiocarbamate	10	15	25
	(16) Zinc diethyl dithiocarbamate	10	15	25
	(17) Zinc dimethyl dithiocarbamate	10	15	25
	(18) Zinc ethylene bisdithiocarbamate	10	15	25
29.32	Organo-arsenic compounds	Free	15	25
29.33	Organo-mercury compounds	Free	15	25
29.34	Other organo-inorganic compounds:			
	(1) Other than the following	Free	15	25
	(2) Diethyl aluminum chloride	10	15	25
	(3) Ethyl aluminum sesquichloride	10	15	25
	(4) Triethyl aluminum	10	15	25
	(5) Tri-isobutyl aluminum	10	15	25
29.35	Heterocyclic compounds; nucleic acids:			
	(1) Other than the following	Free	15	25
	(2) Adrenochrome semicarbazone	10	15	25
	(3) Benzothiazyl disulphide (dibenzothiazolyl disulphide)	10	15	25
	(4) Caprolactam	5	5	15
	(5) Chlorpromazine hydrochloride	10	15	25
	(6) N-Cyclohexyl-2-benzothiazole sulphenamide	10	15	25
	(7) Dinitrosopentamethylene tetramine (3,7-dinitroso-1,3,5,7-tetra- azabicyclo(3,3,1)nonane)	10	15	25
	(8) 2,5-Diphenyloxazole (PPO)	10	15	25
	(9) Diphenylpyraline hydrochloride	10	15	25
	(10) Essential oils, natural or synthetic, of this item	Free	7½	7½
	(11) 6-Ethoxy-1,2-dihydro-2,2,4- trimethylquinoline	10	15	25
	(12) Furazolidone	10	15	25
	(13) Maleic hydrazide	10	15	25
	(14) Melamine	10	15	25
	(15) 2-Mercaptobenzothiazole	10	15	25
	(16) Phenylazo-diamino-pyridine hydrochloride	10	15	25
	(17) Phenylbiphenyloxadiazole (PBD; 2-phenyl-5-(4-biphenyl)- 1,3,4-oxadiazole)	10	15	25
	(18) 1,4-bis-2-(5-phenyloxazolyl)- benzene (POPOP)	10	15	25
	(19) Piperazine phosphate	10	15	25
	(20) Promazine hydrochloride	10	15	25
	(21) Warfarin	10	15	25
	(22) Zinc mercaptobenzothiazole	10	15	25

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
29.36	Sulphonamides:			
	(1) Other than the following	Free	15	25
	(2) Chlorpropamide	10	15	25
	(3) Sodium sulphamethazine	10	15	25
	(4) Sulphadiazine	10	15	25
	(5) Sulphamethazine	10	15	25
29.37	Sultones and sultams	Free	15	25
29.38	Provitamins and vitamins, natural or reproduced by synthesis (including natural concentrates), derivatives thereof used primarily as vitamins, and intermixtures of the foregoing, whether or not in any solvent:			
	(1) Other than the following	Free	15	25
	(2) Intermixtures containing one or more of the products which follow	10	15	25
	(3) Provitamin A	10	15	25
	(4) Vitamin A and its derivatives			
	(a) For use in the production of food products for human consumption	Free	15	25
	(b) For other uses	10	15	25
	(5) Vitamin B ₃ (pantothenic acid) and its derivatives	10	15	25
	(6) Vitamin B ₆ and its derivatives	10	15	25
	(7) Vitamin B ₁₂ and its derivatives	10	15	25
	(8) Vitamin C and its derivatives	10	15	25
	(9) Provitamin D ₃ , vitamin D ₃ and their derivatives	10	15	25
29.39	Hormones, natural or reproduced by synthesis, and derivatives thereof, used primarily as hormones:			
	(1) Other than the following	Free	15	25
	(2) ACTH (adrenocorticotrophin)	10	15	25
	(3) Oxytocin	10	15	25
	(4) Sodium estrone sulphate	10	15	25
	(5) Testosterone enanthate benzilic acid hydrazone	10	15	25
	(6) Triamcinolone	10	15	25
	(7) Vasopressin	10	15	25
29.40	Enzymes:			
	(1) Other than the following	Free	15	25
	(2) Catalase	10	15	25
	(3) Chymotrypsin	10	15	25
	(4) Pancreatin	10	15	25
	(5) Papain	Free	5	17½
	(6) Pepsin	10	15	25
	(7) Rennet	Free	Free	Free
	(8) Trypsin	10	15	25

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
29.41	Glycosides; natural or reproduced by synthesis, and their salts, ethers, esters and other derivatives:			
	(1) Other than the following	Free	15	25
	(2) Aloin	10	15	25
	(3) Rutin	10	15	25
29.42	Vegetable alkaloids, natural or reproduced by synthesis, and their salts, ethers, esters and other derivatives:			
	(1) Other than the following	Free	15	25
	(2) Nicotine and its salts	Free	Free	10
	(3) Quinidine, salts of	Free	Free	Free
	(4) Quinine, salts of	Free	Free	Free
29.43	Sugars, chemically pure, other than sucrose and glucose, but including lactose; sugar ethers and sugar esters, and their salts, other than products of Recommended Items 29.39, 29.41 and 29.42:			
	(1) Other than the following	Free	15	25
	(2) Lactose	10	15	25
29.44	Antibiotics:			
	(1) Other than the following	Free	15	25
	(2) Chloramphenicol and its derivatives	10	15	25
	(3) Penicillin and its derivatives, not including crude penicillin	10	15	25
	(4) Tetracycline and its derivatives	10	15	25
29.45	Other organic compounds:			
	(1) Other than the following	Free	15	25
	(2) Copper acetoarsenite (Paris green)	Free	7½	15
31.00 (in part)	Fertilizers and certain enumerated goods:			
	(1) Fertilizers, formulated; goods for use as fertilizers; all the foregoing whether or not otherwise provided for in this item or elsewhere in Schedule A	Free	Free	Free

Goods Subject to Duty and Free GoodsB.P. M.F.N. G.T.

31.00 (2) The following, when not for use as
 (in part) fertilizers:
 (Cont'd) ...

Calcium cyanamide (cyanamid, line
 nitrogen) containing, in the dry
 state, not more than 25 per cent
 by weight of nitrogen whether or
 not treated with oil

...

Urea containing, in the dry state,
 not more than 45 per cent by
 weight of nitrogen, whether or
 not coated or prilled

Free Free Free



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